SERIES 3, Vol. 11, No. 9 SEPTEMBER, 1928

AMERICAN JOURNAL OF OPHTHALMOLOGY

CONTENTS

For complete table of contents see advertising page V

Subscription twelve dollars yearly. Single number, one dollar twenty-five cents.

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

PUBLICATION OFFICE: 450 AHNAIP STREET, MENASHA, WISCONSIN

EXECUTIVE OFFICE: 7 WEST MADISON STREET, CHICAGO, ILLINOIS

EDITORIAL OFFICE: 530 METROPOLITAN BUILDING, DENVER, COLORADO

Entered as second class matter at the post office at Menasha, Wisconsin

AMERICAN JOURNAL OF OPHTHALMOLOGY
Volume 11 September, 1928 Number 9

THE INTRAVENOUS USE OF TYPHOID-PARATYPHOID VACCINE IN EYE DISEASES

HARVEY J. HOWARD, M.D., D.Oph., F.A.C.S.

SAINT LOUIS

In the Peking Union Medical College, intravenous injections of typhoid-paratyphoid vaccine were used in various ocular affections, including acute or subacute infection of the cunjunctiva, corneal ulcer and all forms of keratitis, uveitis, and iritis from any cause except tuberculosis, certain types of optic neuritis from infection, some retinal disorders, disturbance of the vitreous by exudates, penetrating wounds of the eyeball with marked risk of infection, and secondary glaucoma. Although to obtain an unequivocal result from the investigation other lines of treatment were avoided while the injections were being given, in only four out of the sixty-two cases reported was a negative result obtained. The therapeutic effect seemed to be proportional to the height of the fever caused by the vaccine, and no such effect was obtained from injections not followed by fever. From the department of ophthalmology, Washington University, Saint Louis. Read before the American Ophthalmological Society, April 30 to May 2, 1928.

It has long been known among medical men that localized inflammations may sometimes be relieved or even cured by a severe intercurrent infection. The most striking examples of this phenomenon have been observed in patients suffering from a gonorrheal infection prior to the onset of the intercurrent disease. As further evidence along this line is the fact that one rarely, if ever, sees a gonorrheal infection coexisting with a febrile disease such as malaria, typhoid, or pneumonia, but that it is relatively common in cases suffering from chronic, nonfebrile affections. Some believe that fever patients cannot be infected by the gonococcus.

The beneficial effect of a fever in gonorrheal cases is far from being understood, but there is one explanation which at least is simple and reasonable: The gonococcus is heat sensitive both in vitro and in vivo. The optimum temperature at which it grows in cultures is between 36.5° and 37° C. A slight increase above this inhibits the growth of the organism. A sudden rise to 39° C., or higher means certain death of the culture. The beneficial action of fevers on localized inflammations produced by other bacteria than the gonococcus cannot be so readily explained, since many of them are not killed by even the highest temperature to which the human body may be subject. Furthermore, the relatively greater heat sensitivity of the gonococcus is revealed by the fact that gonorrheal infections disappear, following attacks of fever, more quickly than other infections.

Until recently, the outlook for patients suffering from the disease known as general paralysis of the insane had been practically hopeless. But, according to Yorke[1], it had been known for many years that the symptoms often exhibited remarkable remissions if these patients happened to develop an acute intercurrent disease. In 1912, Wagner von Jauregg[2] of Vienna, as a result of many years' observation of general paralysis, concluded that the rise of temperature which accompanied the intercurrent disease was in some way responsible for the improvement produced in the nervous condition. This theory was strengthened by the results of his experimental work on rabbits infected with syphilis. He found that the spirochetes disappeared

after the temperature had risen several times to 42° or 43° C. (The normal temperature of rabbits is about 2° C. higher than that of humans.) It was on the basis of this hypothesis that Jauregg[3] had begun, several years before, to use tuberculin injections in the treatment of this disease. Later he[4] tried staphylococcic vaccine.

His results on the whole were so encouraging that he decided to test his hypothesis further. He cast around for an infection which could safely be administered to his patients, and which could, after it had run the course he desired, be readily controlled by the use of drugs. Two diseases seemed to fulfill the necessary conditions, namely malaria and relapsing fever. After due trial he found malaria the more satisfactory. During the years 1918-19, he[5] published the results in a long series of general paralytics infected with malarial plasmodia. Those results were so promising that physicians the world over immediately became interested, not only because it appeared that there had been found a treatment for a disease which hitherto had offered no hope of being either arrested or improved, but perhaps even more because of the implications that evolved from Jauregg's work.

Based upon the work of Jauregg and their knowledge of the effect of intercurrent infections upon localized inflammations, many clinicians and research workers have attempted to produce a fever reaction as a form of treatment in various localized and general inflammations. During the past decade or more, numerous animal, vegetable, and mineral substances have been tried. Among those substances, as listed by Peterson[6] are the following: counter-irritants, such as the actual cautery, moxas, and blisters; blood and serums, both normal and immune, from man, animals, fowls, and so on; diphtheria and tetanus antitoxins; proteins in the form of milk, egg albumin, and casein; plant proteins and protein split products; enzymes and tissue extracts; vaccines of all kinds; bacterial extracts and related products; colloidal metals, such as gold, silver, manganese, and mercury; yeasts; irradiations by radium, roentgen rays and actual sunlight; and numerous miscellaneous substances, such as hypertonic salt solutions, sugar solutions, distilled water, formalin, and turpentine. One's first impression upon perusing these lists is that the investigators in question had gone wild in their enthusiasm for experimentation.

But as a result of all this experimentation much valuable information has been gained. For instance, it is now the consensus of opinion that protein substances are the most effective of all those available for the purpose of nonspecific therapy. In fact, there now exists but little doubt that a positive systemic reaction following a protein injection may produce excellent therapeutic results in certain localized inflammations. The accumulating evidence of clinical results and animal experimentation regarding the beneficial effect of protein injections is already overwhelming, although it must be admitted that the whole subject is still only meagerly understood.

We are all familiar with the work of Müller and Thanner[7], who were the first to use milk injections in gonorrheal ophthalmia, as well as in some other acute ocular infections. So important has the use of boiled milk injections become in the treatment of gonorrheal infections of the eye that this form of nonspecific protein treatment will undoubtedly go down in history as one of the great discoveries in ophthalmology during the twentieth century. But important as the use of milk is it has its limitations in ophthalmic therapy. In acute inflammations of the mucous membrane of the eye, injections of boiled milk almost never fail to act like a specific remedy, but in inflammations of the deeper ocular structures the use of milk has been disappointing.

During the years 1919 to 1927, the writer had charge of the department of ophthalmology in the Peking Union Medical College in Peking, China. The Chinese people are subject to the same

diseases of the eye as all other races but, on account of the ignorance of the common people, the inhibiting influence of superstitions centuries old, the low economic level of the country, the comparative lack of a modern public health system, and the political turmoil of the new republic, we found in our eye clinic daily evidence of neglect and of advanced stages of ocular disease which are comparatively uncommon in the United States. Morever, our patients were Chinese, and the average Chinese expects good results quickly from his physician; failing which he leaves this physician to consult another. Our problem was made the more difficult by the necessity of building up and maintaining a large clinic for teaching purposes. On account of all these things we were often forced into radical procedures in treatment and operation.

Our extensive use of intravenous injections of typhoid-paratyphoid vaccine in Peking during the last three years was due to a rather marvellous response to this treatment in a practically hopeless type of double uveitis complicated with secondary glaucoma, in a Chinese woman. Just prior to the onset of the uveitis she had only partially recovered from an exudative chorioretinitis associated with areas of retinal separation. Her visual acuity at one time diminished to the detection of hand movements only. All of our efforts to locate the focus of the infection proved futile. In spite of the most strenuous orthodox treatment she steadily grew worse. At length milk injections were tried, but they made her worse. We got no result from tuberculin. Injections of diphtheria antitoxin failed to help her.

As a last resort I suggested typhoid-paratyphoid vaccine. We began with an intravenous injection of twenty-five million bacilli. In less than twelve hours there was noticeable improvement, in forty-eight hours marked improvement. The yellowish-white deposits on the posterior corneal surfaces were greatly reduced in size and quite brown in color, the exudate in the anterior chamber had half disappeared, and the intraocular tension was considerably reduced. We gave her dose after dose in increasing amounts. Following the tenth intravenous dose (1 c.c., i.e., 2500 million bacilli), we concluded that the inflammation was under control, and shortly after that we discharged her. The acuity of vision of the right eye had been restored to 6/9, but we had been too late to help the visual acuity of the left eye, which evidently had been irretrievably damaged before the vaccine treatment was begun.

Our hopes for her, however, proved to be premature, for several weeks later she developed an acute recurrence of the uveitis, associated with a more severe secondary glaucoma than she had suffered before. Again we found that typhoid vaccine was the only remedy that would arrest and reduce the inflammation.

During the following year this patient had several recurrences, each of which was successfully controlled and combated by typhoid-paratyphoid vaccine. During a period of about eighteen months she received a total of sixty intravenous injections of the vaccine—probably a record in the medical world. There is no evidence that she has suffered any functional or organic disability from those long series of vaccine treatment. With each attack, however, the left eye was left in a worse state than before. It never responded to the treatment as readily as did the right eye. There seemed to be sufficient evidence that the left eye was acting as a secondary focus of infection for the right eye, so with vision gone and with the patient in constant fear of another attack we enucleated the left eye. Our conclusion regarding that eye's acting as a focus of further dissemination of infection was probably correct, because the right eye remained quiet for several months. A moderate recurrence then followed which was quickly and efficaciously combated by typhoid vaccine injection. When I left China in the summer of 1927, the visual acuity

Chart 1

Diseases of the uveal tract

No.	Sex	Age	Principal diagnosis	Complications	No. of injections	Result attributable to vaccine treatment
1	F	33	Acute recurrent uveitis with secondary glaucoma, o.u.	Retrobulbar neuritis, o.u., secondary glaucoma, o.u., chronic tonsillitis.	60	Very much improved, o.d. Enucleated, o.s.
2	M	31	Acute iritis with secondary glaucoma, o.u.	Chronic gonorrheal prostatitis, amebiasis.	5	Improved.
3	M	28	Acute iritis, o.s. Chronic iritis, o.d.	Chronic gonorrheal prostatitis, seminal vesiculitis.	5	Very much improved.
4	M	35	Acute iritis, o.s.	Pyorrhea alveolaris, amebiasis, ascariasis.	2	Much improved.
5	M	24	Acute iritis with syphiloma, o.d. Chronic iritis, o.s.	Syphilis (3), ascariasis, giardiasis.	4	Very much improved.
6	M	29	Chronic iritis with syphiloma, o.s. Chronic iritis, o.d.	Syphilis (4), acute tonsillitis, ascariasis, papular dermatitis.	3	Improved.
7	M	21	Acute iritis with ulcer of cornea, o.s.	Amebiasis.	3	Improved.
8	M	40	Chronic recurrent iritis, o.u. Secondary glaucoma, o.s.	Syphilis (4), gonorrheal urethritis, amebiasis, ascariasis.	2	Improved.
9	M	25	Acute gonorrheal iritis, o.d.	Chronic gonorrheal urethritis, amebiasis.	1	Improved. (Left hospital against advice.)
10	M	39	Acute iridocyclitis with vitreous opacities, o.u.	Ascariasis, amebiasis, pyorrhea alveolaris.	6	Very much improved.
11	M	36	Acute iridocyclitis, o.s.	Syphilis (4), ankylostomiasis, ascariasis.	4	Much improved.
12	F	40	Chronic iridocyclitis, o.u.	Syphilis (2), amebiasis, ascariasis,	1	Not improved.
13	F	62	Sympathetic ophthalmia, o.s.	Ascariasis.	7	Improved.

13	F	62	Sympathetic ophthalmia, o.s.	Ascariasis.	7	Improved.

Chart 2

Diseases of the cornea and sclera

No.	Sex	Age	Principal diagnosis	Complications	No. of injections	Result attributable to vaccine treatment
14	M	53	Deep keratitis and uveitis, o.s.	Amebiasis.	6	Very much improved.
15	F	17	Deep keratitis with chronic trachoma and pannus, o.u.	Amebiasis, ascariasis.	6	Slightly improved.
16	F	38	Sclerosing keratitis, o.s.	Uterine fibroma, hydrosalpinx, cysts of ovary and broad ligament.	2	Slightly improved.
17	F	32	Phlyctenular keratoconjunctivitis, o.d.	Chronic tonsillitis, amebiasis, ascariasis.	3	Much improved.
18	M	24	Phlyctenular keratitis, o.u.	Chronic iritis, o.d., ankylostomiasis.	3	Improved.
19	M	36	Ulcerative keratitis with macula, o.d.	Ascariasis.	3	Improved.
20	M	20	Disciform keratitis, o.d. Acute iritis, o.s.	Amebiasis.	5	Improved.
21	M	19	Interstitial keratitis (congenital syphilis), o.d.	Syphilis (4), amebiasis.	11	Slightly improved.
22	M	19	Interstitial keratitis (congenital syphilis), o.u.	Syphilis (4), ascariasis.	11	Slightly improved.
23	F	28	Interstitial keratitis and uveitis (congenital syphilis), o.u.	Syphilis (4) amebiasis, pyorrhea alveolaris	7	Not improved.
24	M	24	Interstitial keratitis (congenital syphilis), o.s.	Trachoma, o.u., syphilis (4).	3	Slightly improved.
25	M	6	Interstitial keratitis (congenital syphilis), o.u.	Syphilis (4).	4	Improved.
26	F	16	Interstitial keratitis (congenital syphilis), o.u.	Syphilis (4), acute appendicitis, ascariasis.	6	Improved.

Chart 2 (continued)

No.	Sex	Age	Principal diagnosis	Complications	No. of injections	Result attributable to vaccine treatment
27	M	37	Interstitial keratitis (acquired syphilis), o.u.	Syphilis (4), ascariasis, scabies.	4	Improved.
28	M	36	Interstitial keratitis (acquired syphilis), o.u.	Chronic trachoma, syphilis, ascariasis.	4	Improved.
29	M	29	Interstitial keratitis (acquired syphilis), o.u.	Syphilis (4), ankylostomiasis, amebiasis, ascariasis.	8	Slightly improved.
30	F	39	Interstitial keratitis (acquired syphilis), o.u.	Syphilis (4).	4	Improved.
31	F	59	Ulcer of cornea with iritis and hypopyon, o.u.	Trachoma.	1	Improved. (Hypopyon disappeared within 24 hours)
32	M	48	Ulcer of cornea (rodent), o.d.	Giardiasis.	6	Improved.
33	M	45	Ulcer of cornea (catarrhal), o.d.	Syphilis (4), amebiasis, ascariasis.	1	Not improved, but left against advice.
34	M	16	Ulcer of cornea (trachomatous), o.u.	Amebiasis, ascariasis, giardiasis.	2	Improved.
35	M	25	Ulcer of cornea (trachomatous), o.u.	Adherent leukoma, o.s.	1	Improved.
36	M	52	Ulcer of cornea (trachomatous), o.d.	Eczematoid dermatitis (ear)	3	Improved.
37	M	31	Ulcer of cornea (trachomatous), o.d.	Syphilis (4), tapeworm, opium addiction.	1	Improved.
38	M	22	Ulcer of cornea (trachomatous), o.u.	Ascariasis, amebiasis.	1	Slightly improved.
39	M	25	Ulcer of cornea (trachomatous), o.u.	Ascariasis.	2	Much improved.
40	M	24	Ulcer of cornea (trachomatous), o.s.	Syphilis (2), ankylostomiasis, ascariasis.	1	Improved.
41	M	38	Abscess of cornea (pneumococcus and Koch-Weeks), o.u.	Amebiasis, ascariasis.	3	Improved.

Chart 3

Diseases of the retina, optic nerve, and choroid

No.	Sex	Age	Principal diagnosis	Complications	No. of injections	Result attributable to vaccine treatment
42	M	29	Chorioretinitis with vitreous opacities, o.u.	Giardiasis.	8	Slightly improved.
43	M	28	Exudative chorioretinitis with detached retina, o.s.	Amebiasis, ascariasis.	3	Improved.
44	M	16	Exudative choroiditis, o.s.	Ascariasis.	4	Very much improved.
45	M	21	Choroiditis and scleritis, o.s.	Chronic tonsillitis, sinusitis, ankylostomiasis, amebiasis, ascariasis.	3	Improved, but refused operative treatment, so was discharged.
46	M	48	Primary optic atrophy (tabetic), o.u.		3	Slight temporary improvement.
47	M	24	Retrobulbar neuritis, o.u.	Acute tonsillitis, amebiasis, ascariasis.	5	Very much improved.
48	M	43	Retrobulbar neuritis, o.d.	Ankylostomiasis, amebiasis, ascariasis.	11	Very much improved.
49	M	51	Primary optic atrophy (tabetic), o.u.	Syphilis (4), giardiasis.	5	Not improved.
50	M	22	Traumatic retrobulbar neuritis, o.s.	Traumatic sphenoiditis, ankylostomiasis, ascariasis.	4	Improved.

Chart 4

Diseases of the conjunctiva and lids

No.	Sex	Age	Principal diagnosis	Complications	No. of injections	Result attributable to vaccine treatment
51	M	36	Trachoma with pannus, o.u.	Plasmoma of conjunctiva, o.u.	3	Improved (plasmoma was treated and practically cured by radium).
52	M	31	Gonorrheal ophthalmia with corneal ulcers, o.u.	Gonorrheal urethritis, amebiasis, ascariasis.	4	Improved.
53	M	33	Gonorrheal ophthalmia, o.u.	Syphilis (4), gonorrheal urethritis, chronic iritis, o.d.	2	Much improved.
54	M	27	Gonorrheal ophthalmia with corneal ulcer, o.d.	Chronic gonorrheal urethritis, syphilis (4), amebiasis, ascariasis.	2	Improved.
55	M	20	Gonorrheal ophthalmia, o.u.	Chronic gonorrheal urethritis, amebiasis, ascariasis.	3	Cured.
56	M	31	Gonorrheal ophthalmia, o.u. Corneal ulcer, o.d.	Amebiasis.	3	Cured.
57	F	45	Pustular blepharitis, o.s.	Trachoma, o.u., syphilis (4), carbuncle, ascariasis.	1	Improved, but was discharged against advice.

Chart 5

Miscellaneous diseases and affections

No.	Sex	Age	Principal diagnosis	Complications	No. of injections	Result attributable to vaccine treatment
58	M	28	Perforating wound of globe with prolapse of iris, o.s.		2	Improved (no sign of endophthalmitis appeared).
59	M	16	Traumatic cataract (discission of congenital cataract), o.u.		2	Much improved (unusually rapid absorption of lens substance occurred.
60	M	50	Marked vitreous opacities, o.u.	Dental caries, amebiasis.	3	Slightly improved.
61	M	30	Extensive dust-like vitreous opacities, o.s.	Trachoma with pannus.	6	Very much improved.
62	M	39	Extensive vitreous opacities, o.s.	Complicated cataract, o.u., dental caries, pyorrhea alveolaris, amebiasis, ascariasis.	3	Improved.

in the patient's right eye was still 6/9. Whatever the exact character of the disease was, the vaccine was evidently never able fully to cure it, but it never failed immediately to arrest the inflammation and cause it to disappear for weeks at a time.

Encouraged by the results of this form of nonprotein therapy in such a desperate case, and anxious to learn its effect and limitations in other ocular inflammations, we decided to try the vaccine in a wide variety of cases. A preliminary report of this work was presented by the writer[8] before the Section on Ophthalmology of the China Medical Association at its biennial conference in Peking on September 6, 1926. The final results of this work, which are tabulated in charts 1 to 5, refer only to the action of the vaccine treatment, since, with a few exceptions, the patient was first given typhoid vaccine without any other treatment. Many of the cases received other treatment later, but in order to avoid confusion the results of the combined treatment, or of other treatment, are not included in the tables.

Dosage and method of administration: We used mostly a proprietary stock vaccine, 1 c.c. of which contains the following:

typhoid bacilli	1,000 millions
paratyphoid bacilli (a) ..	750 millions
paratyphoid bacilli (b) ..	750 millions
	2,500 millions

For the average adult (weight about 150 lbs.) with good vitality, we injected intravenously twenty-five million bacteria as the first dose. We generally doubled this number for the second dose, and then doubled or nearly doubled the previous dose for each successive dose. At the ninth or the tenth dose, by this routine method, a whole c. c. of vaccine was given. To obtain the dose required the vaccine was diluted according to the following directions:

To 1 c. c. of the vaccine add 9 c. c. of normal saline solution (dilution 1).

To 1 c. c. of dilution 1 add 9 c. c. of normal saline solution (dilution 2).

Then 1 c. c. of dilution 2 contains twenty-five million bacteria, the usual amount of the first dose.

To the dose required add sufficient saline solution to fill a 5 or 10 c. c. syringe. By keeping dilutions 1 and 2 in sealed bottles on ice it is possible to use them for subsequent doses. But great precautions are necessary in order to prevent contamination.

Systemic reactions in relation to dosage: The first dose indicated fairly well what the subsequent reactions in that particular patient would be. There was, of course, no local reaction at the site of the injection, as occurs with milk given intramuscularly.

Thirty to sixty minutes following the intravenous injection, the patient began to have a chill which lasted for half an hour or more. During the chill there developed a leucopenia, which was generally proportionate to the severity of the chill, but the temperature either remained stationary throughout the period of the rigor or went up a little towards the end. In several cases the leucopenia dropped as low as 1,500. The chill was characterized objectively by a weak pulse and signs of poor peripheral circulation, but no case of ours developed signs of collapse.

A severe chill always heralded a quickly developing high fever. The temperature generally rose in two or three hours to 39°C. or over. In the great majority of cases this rise was followed by a rapid fall in the temperature, during which the patient might have another slight chill. This fall (sometimes nearly to normal) was quickly followed by a secondary rise, in which the temperature usually reached a higher point than it did on the first rise, perhaps up to 40°C., rarely above. From this point the temperature slowly fell by lysis during a period of about thirty-six hours. Occasionally the temperature did not reach normal again for forty-eight hours or even longer (see figure 1 for a typical reaction).

The changes in the blood after the chill followed quite regularly the temperature changes, although sometimes in a slightly delayed manner. That is, the leucopenia disappeared as soon as the fever began, and generally the highest leucocyte count was synchronous with the highest temperature attained. A leucocytosis of 20,000 to 25,000 was not uncommon; in several cases it rose as high as 35,000. Durtaneously with the fall in the temperature and in the leucocytosis (see chart 6).

There is another important point in regard to dosage. Whenever the interval between the doses is increased over the usual two or three day period, there must be a proportionate decrease in the amount of the next dose. Our experience has shown that when the interval between doses is a week, for example,

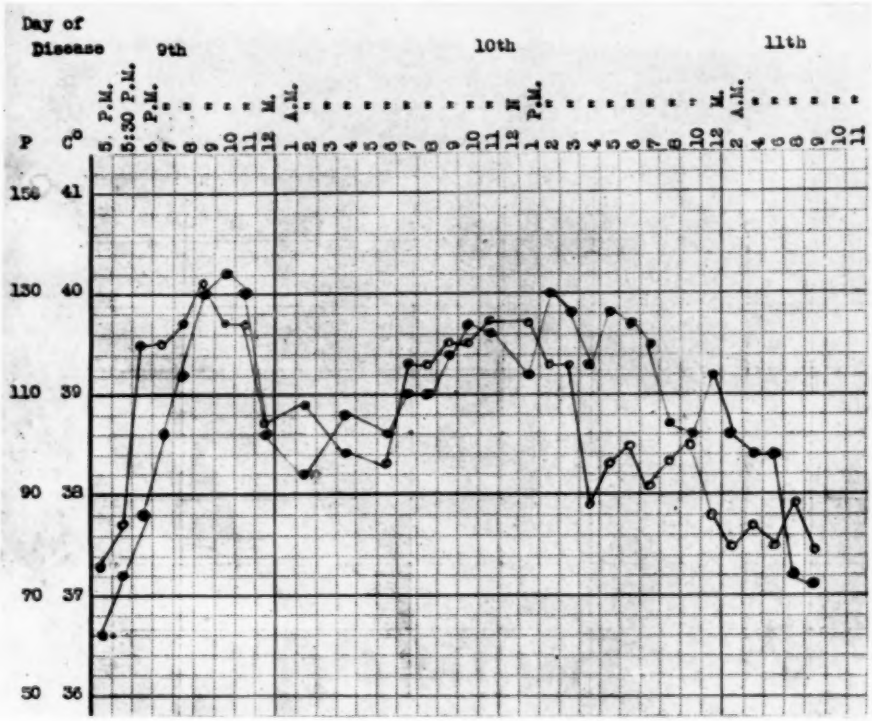


Fig. 1 (Howard). A typical temperature and pulse reaction following the first intravenous dose.

ing the initial leucopenia the polymorphonuclears diminished, while the lymphocytes proportionately increased in number. But during the leucocytosis the reverse phenomenon always occurred, i.e., the polynuclears rapidly and markedly increased, while the mononuclears proportionately diminished. The highest polynuclear count (usually 85 to 90 per cent, sometimes more) coincided with the highest leucocyte count, and the polynuclear count dropped back to normal simultthe next dose should be not more than the last dose; also when the interval between doses is as long as a month or more, as, for example, when a series has been given with good results and a recurrence of the lesion requires another series of injections, then one should begin with the original dose of twenty-five million bacteria.

During the stage of the chill and leucopenia there was a perceptible fall in the systolic blood pressure, and an approximately proportionate rise in the

diastolic pressure. During the stage of the fever and leucocytosis the original systolic pressure was quite uniformly maintained, but there occurred a marked drop in the diastolic pressure —its low point coinciding with the high point of the fever and leucocytosis.

In collaborating with the writer in recording the blood changes that occurred in these patients, Mills[9] tested the antithrombic power of the patients' plasma, and uniformly found the same marked increase in antithrombin that he had observed in cases of typhoid fever. This phenomenon was accompanied by a prolongation of the bleeding time. The increase in antithrombin began with the chill and was maintained during the rising phase of the fever, but disappeared quickly when the temperature began to fall.

The subjective symptoms during the fever were malaise, headache, and loss of appetite. Only one case of ours had nausea, none vomited; nor did any develop complications of more than passing nature. In two cases the pulse became very weak and rose to a rate of 140, but an intravenous injection of 1 c. c. of digipuratum restored the heart's action almost immediately. In these cases we found that two doses of tincture of digitalis, given prior to the subsequent injections of typhoid vaccine, maintained the pulse in good condition throughout the high fever period. There was no evidence of organic heart disease in these two cases, so we felt justified in continuing the vaccine treatment, since the first dose had been followed in each by marked improvement in the eye condition.

After the temperature returned to normal following the first dose, it was our custom to wait for twenty-four hours or so before giving the second dose. On account of the long-continued fever following the first dose, the second dose was usually not given until the third day, sometimes the

Chart 6

Typical temperature and blood reactions to typhoid vaccine resulting from three injections in a Chinese male aged 24 years

	Dose	Temperature (centigrade)	W.b.c.	Differential count Poly.	Small lymph.	Large mono.
A. Prior to injection	First	36.7°	7,200	60	38	2
	Second	36.4°	6,400	67	30	3
	Third	36.6°	6,200	72	35	3
	Average	36.6°	6,600	66	31	3
B. During chill	First	36.7°	1,500	59	41	0
	Second	37.2°	1,400	40	58	2
	Third	37.4°	3,200	45	53	2
	Average	37.1°	2,030	48	51	1
C. At height of fever	First	38.6°	26,000	87	8	5
	Second	39.6°	18,500	89	10	1
	Third	40.0°	36,000	88	11	1
	Average	39.4°	26,800	88	10	2
D. At end of fever	First	37.3°	8,500	68	28	4
	Second	36.8°	7,500	62	34	3
	Third	36.6°	9,800	71	24	5
	Average	36.9°	8,600	67	29	4

fourth. But the temperature reaction following the second dose was rarely longer than eighteen or twenty hours, and that following subsequent doses was usually about ten to fifteen hours, so the third, fourth, fifth doses, etc., were usually given every second day. With the exception of the interval between the first and second doses, such a patient's temperature chart looks typically like the record of a tertian malarial infection. (See figure 2.)

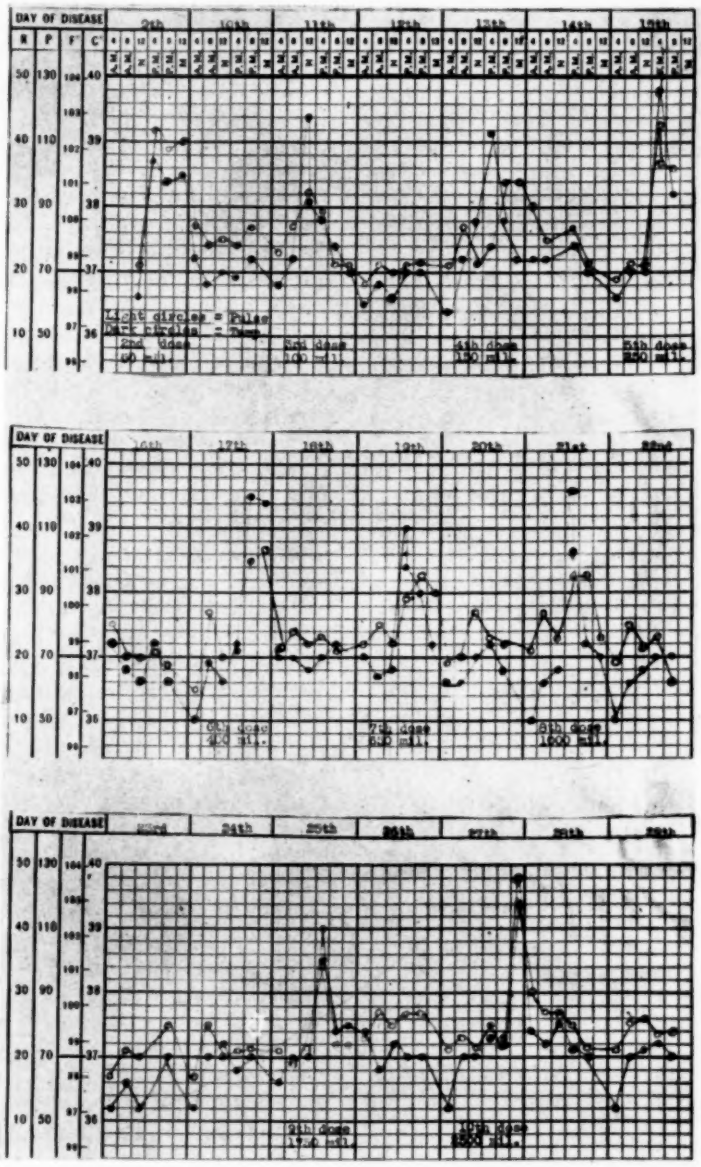


Fig. 2 (Howard). Temperature and pulse reactions from the second to the tenth doses in a case of interstitial keratitis.

I regret the necessity of recording here the death of one patient at the hospital in Peking due to an overdose of typhoid-paratyphoid vaccine. Un-

fortunately for my splendid staff of Chinese physicians, this death occurred after I had transferred the responsibility of the department to them, just prior to my departure from China. Through a mistake by an interne a patient was given an intravenous dose of vaccine containing fifty million bacilli, as a second dose, at the very height of the fever following the first dose of twenty-five million bacilli which had been given less than twenty-four hours before. The patient's temperature rose rapidly to 42°C. and he died about fifteen hours after the second dose. It was an unfortunate and wholly unnecessary accident, but one which ought not to detract from one's good opinion of typhoid vaccine therapy when used according to definite rules governing dosage and injection intervals. However, it does emphasize what we already knew, namely, that the margin between the physiological and lethal doses is not a wide one.

Therapeutic results and possible explanations: The focal reaction is certainly a positive one, but not in the sense in which that word is generally used. That is, the first dose as well as subsequent doses was never characterized by an increase in the ocular inflammation, but rather by a distinct improvement in most of our cases. In other words, the defense mechanism was activated, rather than the invading organisms or toxins stimulated. The patients, of course, noticed their own improvement, and sometimes asked for another dose. The discomfort caused by the artificially produced fever was slight compared with the pain associated with a deep ulcer of the cornea, for instance. In the absence of other treatment capable of producing as good results, we felt justified in continuing the vaccine treatment, whenever the first dose proved effective, although it undoubtedly was empirical to do so.

The size and number of the doses are dependent upon the systemic reactions, the character of the subjective symptoms, and the nature and degree of the focal reaction; in brief, the rate of improvement, if any. Since most of our cases were selected, in the sense, first, that they were serious and, second, that the old methods of treatment for such affections have never been very satisfactory, we were loath to discontinue the vaccine treatment until convinced that it would not help. If a case showed no improvement or only slight improvement after three doses, there seemed to us no indication to continue. In only four out of the sixty-two cases reported in this paper did we have negative results following the use of the vaccine. One patient left the hospital after the first dose. The other three cases subsequently also showed no improvement under other methods of treatment.

I desire to emphasize an early statement to the effect that with only a few exceptions, the results of the vaccine treatment, as shown in the charts of the sixty-two cases, were not complicated with the results of other treatment. Many of the patients left the hospital cured. Many others left greatly improved, but they were started on the road to recovery by the use of vaccine, and when that was finally stopped the usual methods of treatment for such cases were at once begun. This study was made for the purpose of determining the efficacy of typhoid vaccine. There was no point in adding other forms of treatment when the vaccine was producing a distinct therapeutic improvement in the ocular affection. Nor was there any point in pursuing the vaccine treatment further if the patient showed no, or but slight improvement after two or three doses. On the whole, I am sure that these cases were more fortunate than those which came to our clinic before we began to use the vaccine. I should further add that no case was given a single dose more than what we felt he required to bring him well along on the road to recovery, so that thereafter the simpler, the usual, and the less radical means of treatment might be satisfactorily and successfully applied.

The charts show that the majority of the patients were suffering with

general complications, of which some were of serious nature. These complications may have been partly or wholly responsible as primary foci for the ocular affections. It hardly seems necessary to state that in every case these complications were treated before the patient left the hospital.

In our experience no benefit resulted from an injection of vaccine that was not followed by fever. Furthermore, the degree of improvement seemed to be directly proportionate to the fever reaction. On this point our experience does not differ from the consensus of opinion regarding the effect of nonspecific protein therapy in general.

Typhoid vaccine treatment evidently does not confer immunity upon a healed or nearly healed eye, for in our first case, for example, several relapses occurred after previous attacks had been aborted. Whatever the benefit that is derived from such treatment, it is evidently associated with, and perhaps dependent upon, the protein shock. But to explain protein shock in an adequate manner is not yet possible; our present understanding of the subject is still too meager.

Some say that the good effect of such shock results from increase of antibodies in the blood. Peterson[9] states that such increase may often be demonstrated, but that it is not a constant result following an injection. Therefore it can not be identified as the sole cause of the abortive recovery of the patient. He suggests that the sudden flooding of the lymph spaces by the antibodies, after the permeability of the capillaries has been increased following a protein shock, may be the vital factor in overcoming the infection. Bearing on this point, Frazer and Duncan[10] state that injections of endotoxins always produce toxic symptoms with little or no increase of antibodies, and with comparatively little therapeutic effect. They suggest therefore the use of various vaccines which have been more or less detoxicated by being stored for several months. But in typhoid vaccine the necessity for detoxication is practically nil, since in the first place the organism is a large one, and in the second place, according to Thomson[11], the primary poisonous molecule of Vaughan is small in proportion to the secondary and tertiary sensitizing groups.

Regarding the good effect of typhoid vaccine, it seems to be generally agreed that it does not act directly on the causative agent of the inflammation, but indirectly in stimulating a quick and powerful defense mechanism on the part of the body forces. It cannot be referred to as having a curative action after the manner of a specific remedy, any more than instillations of an atropine solution in iritis may be considered as directly curative, but it almost always initiates an improvement, sometimes markedly, and potentiates the action of the usual local and general treatment. With two exceptions we found that typhoid vaccine was surprisingly efficacious in syphilitic affections of the cornea and uveal tract. It not only initiated an improvement before specific treatment was given, but without a doubt also accelerated the disappearance of the lesions when given in conjunction with specific treatment.

In a recent admirable communication, Allen[12] states that he found intravenous injections of typhoid vaccine preferable to intramuscular injections of milk in the treatment of some ocular inflammations. Boyd[13] reports good results with the vaccine in cases of iritis. Engman and McGarry[14] began to use typhoid vaccine about ten years ago in the treatment of a variety of skin diseases, including a few syphilids, lupus, and psoriasis. In China, Cadbury[15] was the first to use the vaccine in nonspecific therapy. He reports that various forms of arthritis were either cured or relieved, and that some syphilitic affections were somewhat improved. In neuralgia the vaccine was effectual in relieving the pain. He also tried it with excellent results in several forms of skin lesion.

Indications: In the hospital of the Peking Union Medical College, we

found intravenous injections of typhoid-paratyphoid vaccine efficacious in the following eye affections:

1. Acute or subacute infections of the conjunctiva when the disease was unusually severe or prolonged.
2. Ulcers of the cornea and all forms of keratitis.
3. Uveitis, iridocyclitis, and iritis, no matter what the cause, with the exception of tuberculosis.
4. Optic neuritis, especially the retrobulbar type and those apparently due to focal infection.
5. Edema of the retina, retinal hemorrhages, and exudative chorioretinitis.
6. Hemorrhages and exudates from the retina or choroid into the vitreous; also acutely developing vitreous opacities, particularly those of the massive dust-like type.
7. The absorption of soft lens matter following traumatic cataract or discission of a congenital cataract, or following a cataract extraction in which considerable lens substance was left behind.
8. Penetrating wounds of the eyeball, in order to prevent endophthalmitis or panophthalmitis (an exceedingly important use).
9. Secondary glaucoma, to reduce intraocular tension, especially when associated with an inflamed iris and a turbid aqueous.

Contraindications: 1. The presence of more than one-half degree centigrade of temperature above normal.
2. Low vitality.
3. Any condition in which the added strain occasioned by a protein shock might not be well borne by the heart.

Summary

1. Typhoid-paratyphoid vaccine, given intravenously, is one of the best proteins available for nonspecific therapy in many ocular disorders.
2. The first dose should not contain more than twenty-five million bacilli for an adult of good vitality whose weight is about one hundred and fifty pounds. Variations from this rule should be made proportionate to body weight, but in patients with diminished vitality it is well to give only about two-thirds of the ordinary dose.
3. A period of at least twenty-four hours should elapse from the time when the patient's temperature returns to normal before the next dose is given. According to this rule the second dose should not be given until the third day after the initial dose was given. The third and subsequent doses may be given every second day.
4. Its use is indicated in all acute and subacute inflammations of the eye, with the exception of those caused by the tubercle bacillus.
5. In penetrating wounds of the eye an early injection should be given as a prophylactic measure against intraocular infection.
6. In syphilitic lesions of the eye it acts as a potentiator of the specific treatment.
7. In gonorrheal ophthalmia, intramuscular injections of milk are probably more potent than intravenous injections of typhoid vaccine.
8. The intravenous use of typhoid vaccine is contraindicated in cases with fever, low vitality, and organic heart affections.
9. When given without supporting treatment it usually initiates such an improvement in the patient's condition that less severe measures may be employed alone, during the late stage of recession of the disease, in order to effect a final cure.
10. When given simultaneously with the usual local and general treatment, it nearly always potentiates the action of that treatment, thereby shortening the course of the disease, and reducing the danger of permanent damage resulting from a more prolonged inflammation.
11. It should not be substituted for other effective means of treatment, but should be considered as a valuable addition to our therapeutic armamentarium.
12. Intravenous injections of the

vaccine are followed, first, by a chill and leucopenia, and then by high fever and leucocytosis, in which the polynuclears are proportionately much increased.

13. The therapeutic effect seems to be proportional to the height of the fever; furthermore, no such effect is obtained from injections not followed by fever.

14. On the basis of the results obtained in inflammations localized in the eye, it seems reasonable to suppose that typhoid-paratyphoid vaccine might prove equally efficacious in acute and subacute inflammations (nonfebrile or nearly so) localized in other parts of the body.

15. If the repeated production of a high fever be the effective factor in treating general paresis by inoculating the patient with malarial plasmodia, then the intravenous use of typhoid-paratyphoid vaccine ought to be as effective, without the necessity of subsequently giving strenuous treatment for an added disease.

Euclid avenue and Kingshighway.

References

[1] Yorke, Warrington. The malaria treatment of general paralysis. Nature, 1924, v. 114, p. 615.

[2] Jauregg, Wagner. Ueber Behandlung der progressiven Paralyse mit Bakterientoxinen. Wien. klin. Woch., 1912, v. 25, p. 61.

[3] Jauregg, Wagner. Concerning tuberculin treatment in general paralysis. Wien. med. Woch., 1909. Verhandl. des 16. internat. med. Kongresses in Budapest, 1910.

[4] Jauregg, Wagner. Ueber Behandlung der progressiven Paralyse mit Staphylokokkenvakzine. Wien. med. Woch., 1913, v. 63, p. 2556.

[5] Jauregg, Wagner. Ueber die Einwirkung der Malaria auf die progressive Paralyse. Psychiat.-neurol. Woch., Halle a. S., 1918-19, v. 20, pp. 132, 251; also in J. Nerv. and Ment. Dis., 1922, v. 55, p. 369.

[6] Peterson, W. F. Protein therapy and nonspecific resistance. Macmillan, New York, 1922.

[7] Müller, L., and Thanner, C. Heilung der Iritis and anderer Augenerkrankungen durch parenterale Eiweissinjektionen. Med. Klin., 1916, v. 12, p. 1120.

[8] Howard, H. J. Nonspecific protein therapy in eye inflammations, with special reference to the use of typhoid vaccine. China Med. Jour., 1927, v. 41, pp. 395, 407.

[9] Howard, H. J., and Mills, C. A. Blood changes following injections of typhoid-paratyphoid vaccine. Proc. Soc. Exp. Biol. and Med., 1927, v. 24, p. 703.

[10] Frazer, A. R., and Duncan, A. G. B. The treatment of chronic gonorrheal rheumatism by vaccines given intravenously. Lancet, 1920, v. 198, p. 248.

[11] Thomson, David. Detoxicated vaccines. Lancet, 1919, v. 196, p. 1102.

[12] Allen, T. D. Typhoid vaccine in ophthalmology. Trans. Amer. Med. Assoc., Sec. Ophth., 1925, p. 135.

[13] Boyd, Wm. Some uses of nonspecific protein therapy. J. Lab. and Clin. Med., 1919, v. 5, p. 88.

[14] Engman, M. F., and McGarry, R. A. The treatment of certain diseases of the skin by the intravenous injection of a foreign protein. Jour. Amer. Med. Assoc., 1916, v. 67, p. 1741.

[15] Cadbury, W. W. Injections of typhoid vaccine in various diseases. China Med. Jour., 1919, v. 33, p. 213.

BACTERIAL ANTIGEN IN UVEITIS

R. E. Mason, M.D.

SAINT LOUIS

The bacterial antigen referred to was used in eight cases which are described; usually for treatment of an active uveitis, but sometimes as a prophylactic against the possible results of infection after an injury. Read before the Ophthalmic Section of the Saint Louis Medical Society, April 20, 1928.

In this paper it is my purpose to set forth observations and conclusions as to the treatment of uveitis by the use of a bacterial antigen.

A bacterial antigen has been described as a substance capable of stimulating the development of immune bodies for prophylactic and therapeutic purposes, and, while its exact nature has not been definitely ascertained, the antigen in question is prepared by washing the live bacterial cells for a short time with normal salt solution after taking them from the cultural medium on which they have grown. Being merely washings, and not the bacteria themselves nor the cultural medium, this antigen contains a very low protein content and is free from toxins.

For twenty-five years, since Wright introduced the principle of treating certain infectious diseases by the injection of bacterial vaccines, the medical profession has been intensely interested in the study of active immunity against infectious diseases by the use of specific bacterins. In the past few years some brilliant work has been done in nonspecific treatment by the method known as "protein shock."

The literature records some extremely interesting reports of this line of treatment in diseases of the eye. Key[1] carried out extensive experiments on rabbits with the injection of a foreign protein, and believes the diphtheria antitoxin is the best form of nonspecific protein. Gaston[2] is of the opinion that a high febrile reaction after a milk injection is of benefit and a high bacterial count desirable.

The use of milk injections or other large amounts of foreign protein is accompanied by certain unpleasant symptoms and some danger to the patient. The anaphylactic shock from a milk injection will cause certain heart and respiratory disturbances which in some patients assume serious proportions. Tuberculous children will register a rise in temperature which will continue for weeks after a milk injection, and in status lymphaticus and asthenia the shock following milk injections may prove fatal.

In an endeavor to find some biological product that would give us the good results of a foreign protein without severe shock following its injection, we used in the treatment of iritis and iridocyclitis an antigen which contained steptococcus hemolyticus with staphylococcus aureus and albus, and which had a very low protein content and was nontoxic. We gave it by intramuscular injection, beginning with one c. c. and increasing 0.5 c. c. every twenty-four hours or every second day depending on the severity of the case. Our maximum dose was rarely over two c. c. at one injection, and we expected to see a definite improvement within twenty-four hours. No case registered any shock or chill, and the temperature did not register over 0.5 degree above normal. We used the combined antigen sold by a well known pharmaceutical house* under the trade name of "streptococcus immunogen combined".

Our results from this bacterial antigen have been so striking that the writer is of the opinion that it is specific in its action in this class of cases. The entire absence of shock, fever, and chill following its use will certainly rule out any claim that its efficiency is due

* Parke, Davis, and Company.

to a foreign protein. The treatment of iritis and iridocyclitis has changed so little in the past twenty-five years that any remedy that can be safely used and will stop the almost unbearable pain which these patients suffer is certainly worthy of a thorough trial.

Case reports: (1) J. F., aged thirty-three years, reported to me on July 8, 1927, giving a history of his left eye being very painful for the past week and with no history of any injury. Examinations showed a very marked case of exudative iritis accompanied by the most severe pain and very low vision. A Wassermann test and urinalysis were negative, and there was no pathologic condition in the ears, nose, throat, or teeth which could be blamed for the trouble in his eye. After giving him the usual local treatment for this type of disease I also injected one c.c of the streptococcus immunogen combined, intramuscularly. After twenty-four hours he stated that his pain was very decidedly better, the pupil began to dilate under the use of atropine, and our records show that on the thirteenth he was suffering no pain at all and the sclera was beginning to assume its normal white color. He was discharged on the twenty-second with normal vision.

(2) L. H. W. reported on July 25, 1927, with some deeply seated infection involving both the upper and lower eyelids of his right eye, but no indication of it pointing in any place. After the usual local treatment, including antiseptic hot compresses, on the third day we made an incision in the upper lid. This was followed by a mild discharge of pus, but the infection assumed more of the character of a cellulitis and a smear of the pus showed a staphylococcus. There being no improvement after several days treatment, I gave him an injection of one c.c. of the combined streptococcus immunogen, repeating it each day for four days. On the second day following the use of the immunogen the patient showed very decided improvement, the swelling and inflammation disappeared, and the patient returned to work on the sixth day with no further complication.

(3) J. G. C. reported on August 20, 1927, stating that two days previously one of his small boys had struck him accidentally in the right eye with an elbow. Examination on the twentieth did not show any external wound, but there was very deep corneal injection and excruciating pain, and the cornea was smoky and the iris dull. Atropine and hot applications were used for two days, but the cornea continued very steamy and the iris did not respond to the mydriatic. On the third day he developed a typical descemetitis. The Wassermann report and urinalysis were negative but a skiagram of the teeth showed some apical pathology on the first right bicuspid. The tooth was extracted on the twenty-sixth of August. Following this there was no improvement for a week or ten days. I then gave him injections of immunogen daily, in slightly increasing dose. After the third injection he showed a distinct improvement in his eye, the pain was relieved, the pupil dilated under the use of atropine, and the inflammation receded. He was discharged on the tenth of September as cured.

(4) H. H., aged 35 years, reported January 30, 1928, with no history of an injury. His right eye was deeply inflamed, the cornea smoky, the pupil contracted to a pin point. Excruciating pain radiated from the eye backwards. A grayish white exudate extended down from the iris across the pupil, and the iris was very dull in appearance. He gave a history of having had a similar attack several years previously. An examination of the nasal sinuses and teeth was negative and, as there was no improvement under local treatment of his case, I placed him in the hospital and gave him an injection of one c. c. of streptococcus immunogen combined, increasing the dose on the following four days to as high as two c. c. per injection. He showed immediate improvement after the first night and the pain practically disap-

peared. After the fifth day we were able to discharge him from the hospital. The eye showed no exudate in the anterior chamber, the iris had resumed its normal appearance, responding to atropine, and the pericorneal injection was practically gone. He made an uneventful recovery and resumed his work with normal vision.

(5) Miss I. V., aged eighteen years, reported to us on the fourteenth day of January, 1928, giving a history that from the day after Christmas her left eye had been red and inflamed for three days, but not particularly painful. Following this condition the eye cleared up somewhat and the girl continued her work, but she noticed a blurring of her vision. There was no history of an accident. Examination showed very mild ciliary injection and a very marked descemetitis in the lower segment of the left cornea. The iris and lens were both clear, and teeth, tonsils and sinuses were apparently normal. On the second day I gave her an injection of 0.5 c. c. of streptococcus immunogen combined, increasing by 0.25 c. c. each day for three doses. On the fourth day there were a very few spots on Descemet's membrane and no inflammation, and on the seventh day the eye appeared perfectly normal. She was discharged with normal vision.

(6) C. R., aged thirty years, was first sent to me on May 3, 1927, following an injury to his left eye by striking it against a tobacco rack. He was treated in a clinic for four weeks. Our examination on the first day showed a very deeply injected eye, with a corneal ulcer from the limbus to the center of the pupil, occupying a quarter segment of the eye. Our records show that there was involvement of the iris and an adhesion of the iris and the lens at one point. After about six weeks treatment he was discharged from our service, showing considerably lowered vision from the scar but with the rest of the eye apparently normal.

On February 15, 1928, he again reported to me with a well developed case of iritis of his left eye, which he said had come on suddenly two days previously. His vision was light perception only, the cornea was distinctly steamy in appearance, the eye extremely painful, and there was a deep pericorneal injection. The Wassermann report was negative. The use of atropine, dionin, and hot applications gave little if any relief, and, as we were at a loss to account for the etiology in this case, we gave him an injection of one c. c. of the streptococcus immunogen, and then increased the dose daily. After the second injection he showed remarkable improvement, with relief from pain, some dilatation, and a clearing up of the inflammation. After six such injections the immunogen was discontinued, and only local treatment was used. The patient was discharged on the tenth day with the eye normal except as to the corneal scar which had developed a year earlier.

(7) F. McC., aged seventeen years, was injured January 28, 1927, by having a baling wire penetrate the right eye at the corneoscleral limbus, some of the iris protruding from the wound. The boy was hospitalized, the wound repaired, and one c. c. of the streptococcus immunogen combined given intramuscularly. A similar injection was given on the thirtieth and thirty-first of January, and on the second, fourth, and sixth of February. The eye at no time showed any tendency towards infection, the wound closed, and, outside of some vitreous opacities which seemed attached in the neighborhood of the ciliary body just behind the wound of entrance and the pupil being slightly pear shaped, he had complete recovery and was discharged with 20/30 vision. There was no shock or chill following the use of the immunogen, and the temperature showed a rise of only 0.5 degree.

(8) T. J., aged forty-five years, was injured on January 26, 1927, by being struck in the right eye with some foreign body while hammering on a steel rail. He reported to us on the seventh of February, showing a lacerated wound on the cornea from the center of the pupil to the corneoscleral limbus. The crystalline lens was cataractous, the

eye very deeply inflamed, and a skiagram showed a foreign body 3 by 4 by 5 millimeters in the bottom of the vitreous chamber. We removed the foreign body, which proved to be the end of a steel pick, through a scleral incision, and gave him a one c. c. injection of the streptococcus immunogen combined, which was followed by five further injections. Following the operation the inflammation cleared up to a very marked extent and there was no pain. However, in a few weeks there was gradual shrinking of the eyeball, accompanied by low tension, and as the eye was blind I advised and performed an enucleation.

Frisco building.

References

1 Key, B. W. Protein injection in severe ocular infections. Arch. of Ophth., 1922, v. 53, pp. 471-482.

2 Gaston. Milk injections in ophthalmic diseases. Amer. Jour. Ophth., 1926, v. 9, pp. 111 115.

GLAUCOSAN IN GLAUCOMA

A preliminary report

DOHRMANN K. PISCHEL, M.D.

SAN FRANCISCO

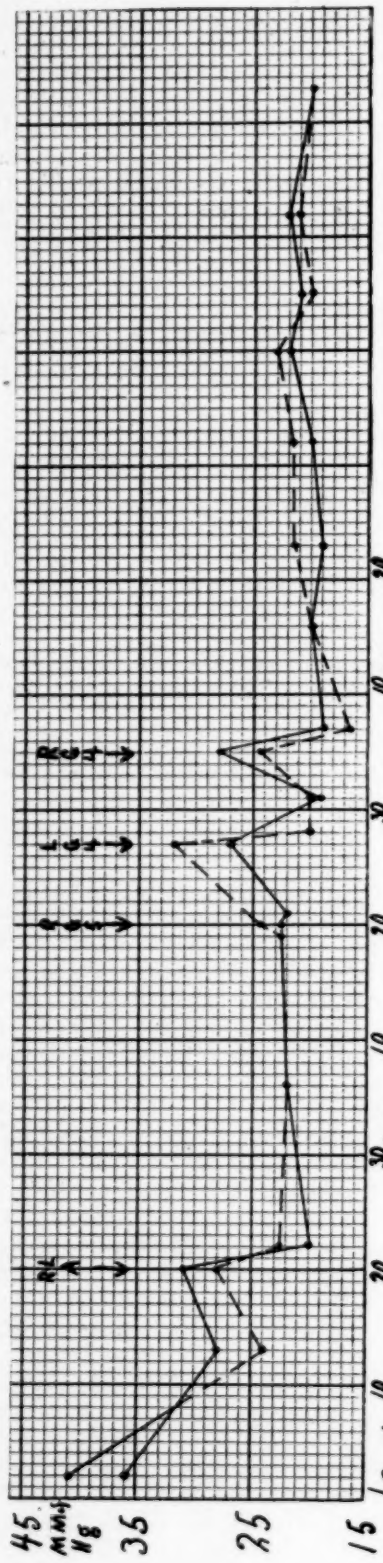
The reactions of a small series of glaucoma patients to levoglaucosan (Linksglaucosan) are carefully studied. In the cases of glaucoma simplex, levoglaucosan always reduced the tension. In some cases after its use miotics again became effective. On account of a possible secondary rise of tension after the drug, the patient should always be under observation. Read before the Eye, Ear, Nose, and Throat Section of the San Francisco County Medical Society, February 28, 1928. From the department of ophthalmology of the University of California.

The use of adrenalin or suprarenin in combating glaucoma simplex, introduced by Hamburger in 1922, is undoubtedly familiar to all ophthalmologists. It had, however, the disadvantage of systemic reactions, such as raised blood pressure, increased heart rate, feeling of dizziness, and so on. To obviate these disadvantages Hamburger developed glaucosan. This is a combination of two substances; one a dextrorotatory suprarenin (in contradistinction to the usual suprarenin, which is levorotatory) and secondly a polariscopically neutral precursor in the synthetic production of suprarenin*. These substances are used in combinations of 1 to 500 and 1 to 1000 respectively.

While this substance, glaucosan, can be used to instil into the eye, it is rather weak and is intended for subconjunctival injection. A more powerful substance was sought for instillation. It was found but it necessitated a return to the levorotatory substances. This was called levoglaucosan ("Linksglaucosan"), a synthetic levorotatory tartaric acid alkaloid derived from the suprarenal capsule. It is used in a two per cent strength and is combined with the optically inactive basic compound mentioned above as being found in glaucosan, also in two per cent strength. Due to its great activity it should never be injected.

A third substance is called aminglaucosan. While the two substances glaucosan and levoglaucosan dilate the pupil, aminglaucosan is a powerful miotic, in fact it will contract in a few minutes pupils dilated with atropin and scopolamin. This is really an amin derivative of ergot, histamin. As it brings about a marked reaction in the conjunctiva, with chemosis and hyperemia, and as considerable pain is induced, it is only indicated in an emer-

* Methylaminoacetopyrocatechal.



Graph 1 (Pischel). Mr. A. F. Tension is in millimeters of mercury, Schiøtz. A, adrenalin. G, levoglaucosan. R, right eye. L, left eye. Numbers indicate numbers of drops instilled. Continuous line, right eye. Broken line, left eye.

gency and is hence restricted to the treatment of acute glaucoma cases.

Summing up the three different types of glaucosan, there is the dextrorotatory glaucosan for injection, having no systemic reaction; secondly the very concentrated substance levoglaucosan for instillation only, with very few systemic reactions; thirdly aminglaucosan for instillation only in acute glaucoma attacks. In the treatment of glaucoma simplex, then, we have two substances, glaucosan and levoglaucosan. The choice naturally falls to the second, levoglaucosan, due to the simplicity of its use by instillation. The method of usage is as follows. Holocain is instilled, and one should wait until the secretion set up by the holocain has ceased. One or two drops of levoglaucosan are then dropped into the conjunctival sac. The patient should hold the head well back, while lying in a supine position, so that the solution does not run out of the eye and can get across to all parts of it. The instillation can be repeated every fifteen minutes up to five instillations. In the course of a few minutes the eyes become porcelain white, and the lid aperture becomes larger. The pupils dilate fairly rapidly, at first often eccentrically, then to the maximum. Small islands of anemia scattered over the skin of the lid and extending an inch or two down the cheek are frequently to be observed, but these pass off and leave no trace.

The question naturally arises whether there are any untoward results. Apparently there are no untoward systemic results. In the eye itself occasionally a fine glistening scaly film forms over the cornea. This gives a sensation of smarting. It may perhaps be a crystalline deposit. This disappears in the course of two or three hours. We observed this in one of our patients, and after hot compresses the pain and the signs entirely disappeared. Another patient of ours, an hour or so after instillation of these drops, has frequently complained of pain. This she combats by hot compresses, which give her complete relief.

Now as to the benefits to the eye. Hamburger, who developed glaucosan, feels that practically every case of glaucoma simplex is amenable to treatment with this drug, and that the tension can be kept at a safe level through its use. With only a small number of cases personally observed so far, it would be presumptuous to contradict this statement absolutely. I will limit myself to reporting our results, in the hope that this will stimulate others to do likewise and that this cooperation will enable us to arrive at some definite conclusions. The tension comes down in the course of a number of minutes or hours, sometimes in most dramatic fashion. It stays down for various periods of time, acting better in some eyes than in others. In our worst case the tension stayed down at least two days. In some of our favorable cases the tension has remained down for as much as ten days to two weeks. In one case we have only had to instil the drops of levoglaucosan twice, and the tension has remained permanently low with the aid of pilocarpin.

In some cases, after using the levoglaucosan drops several times, pilocarpin and eserin, which had ceased to be efficacious, recovered their power to keep the tension down. A brief history of one of these cases follows. (Graph 1.)

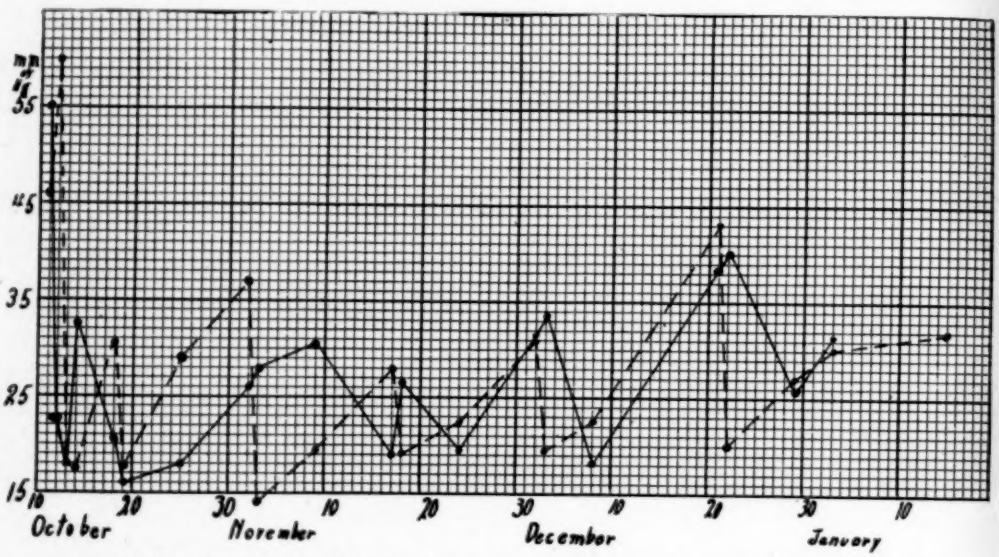
Mr. A. F. (8752), aged seventy-two years, came September 2, 1927. About seven years ago he noticed that he could not see so well as formerly. He was under the care of several doctors for the past two years and had been using pilocarpin and eserin, but the vision had failed nevertheless. The lenses showed a moderately advanced nuclear cataract on each side, with some incipient cataract spokes. The vision of the right eye was counting fingers, that of the left eye 5/30. The field of the right eye was only eccentric temporally. The field of the left eye showed no peripheral loss but the blind spot distinctly enlarged. The loss of vision in this eye was undoubtedly due to the nuclear cataract. Tension right eye 36, left eye 46 mm. of mercury Schiøtz.

The patient was put on pilocarpin and then pilocarpin and eserin. The tension gradually came down, but in about three weeks went up again. On September 20th, adrenalin was used in each eye and caused a marked drop in tension. The tension stayed down, but there had been a few temporary increases at the time we started using levoglaucosan. The right eye had levoglaucosan instilled and showed a slight drop, then a slight rise, then a marked drop without any further instillation. The left eye reacted in a similar way. In all, the levoglaucosan was only instilled twice in the right eye and once in the left. Since that time the tension has stayed down fairly well, always below twenty-two mm. of mercury. The field up to the present time has shown no changes, except that the blind spot is possibly increased two degrees in size.

In another group of cases the tension only stays down a short time in spite of the use of miotics in the interval, and then comes up to a comparatively high level again. One case history will illustrate this. (Graph 2.)

Mr. S. (8726), aged fifty-two years, came October 11, 1927. For the past two years the sight of the left eye had failed considerably. The right eye had had poor vision since a very severe attack of interstitial keratitis in childhood. Examination showed in the right eye a large corneal macula directly over the pupil. In the left eye, under high magnification, there were traces of an old interstitial keratitis. The fundus of the right eye showed a large central healed choroiditis, the fundus of the left eye a moderately large excavation, otherwise normal. The vision of the right eye was 1/60, that of the left eye 5/9. The field of the right eye was peripherally normal, with a large central scotoma due to the old choroiditis. The left field was contracted peripherally, especially on the nasal side. The tension of the right eye was 55, of the left eye 46 mm. of mercury Schiøtz.

Levoglaucosan was first instilled in the right eye. The tension was then 55, but the next day it had fallen to 22.5 mm. The next day levoglaucosan was used in the left eye also with a remarkable drop from 60 to 18 mm. Pilocarpin and eserin were started at once. The tension dropped every time levoglaucosan was instilled, and remained down for a variable length of time, at first only for a few days and then gradually for longer and longer periods; but it persistently returned to a dangerously high level, that is around



Graph 2 (Pischel). Mr. S. Tension is in millimeters of mercury, Schiøtz. G, levoglaucosan. R, right eye. L, left eye. Numbers indicate numbers of drops instilled. Continuous line, right eye. Broken line, left eye.

thirty mm. In the meantime the vision had remained the same in the right eye and had improved slightly in the left eye. The field of the right eye has always remained unchanged. That of the left eye has increased in size, the nasal depression disappearing to a great extent, apparently indicating that the nerve fibers had only been compressed, not killed. As, however, even with the aid of levoglaucosan the tension continued to return in ten to twelve days, we decided the results were not sufficiently good and we resorted to surgical intervention.

Do any bad results arise from levoglaucosan? This is hard to answer yet. We had two cases which may belong to such a group. Mr. P. (6665) was a man of seventy-six years with one eye whose tension had frequently been up around 38 mm. and who saw halos very often. He came to see us at the middle of September, saying he had an attack of blurred vision and could see around the light colored rings which he had not seen for several years. At that time the vision was fair, 5/9 (reduced by incipient cataract), the field normal, and the blind spot not enlarged. At the beginning of October we gave him some glaucosan and the tension dropped immediately. One month later he came to us again. We took the tension and found it very hard once more. The blind spot and field were still normal. November 20th, levoglaucosan was instilled and the next day the eye was soft. Four days later he returned stating that the day before he had been very excited and had begun to see halos again. At that time the field and blind spot were normal, vision as before, tension to the fingers very high. Glaucosan was instilled, but without any decrease in tension. The

next morning the eye was very hard, vision decreased. An acute attack had set in, and operation was resorted to with good results. At present his only bad result is a slight increase in the size of the blind spot. The question remains, was this attack brought on by the glaucosan or was it coming on anyway.

Another similar case was in an old man of eighty-six years who consulted us complaining of loss of vision in his only eye. The tension was only 22.5 mm. of mercury, but apparently his was a case in which even that much tension was too high for the eye. The field was contracted everywhere to ten degrees, except as to a fan-shaped area extending 25 degrees temporally below. The fundus showed moderate excavation, marked pallor of the disc, a venous pulse, and a very granular macula. The vision was only 5/9, due to a high astigmatism. With pilocarpin and eserin the tension remained near 22 mm. About the middle of October, that is about one month after we saw the patient first, as the field was shrinking, glaucosan was used with a remarkable drop from 22 to 17.5 mm. Shortly afterward, however, the tension was up to 25 mm., higher than it had ever been previously; but with the use of glaucosan it immediately came down to 19 mm. One month later there was again a little rise in tension which came down satisfactorily with glaucosan. At the end of November the tension once more rose, and the field had slightly decreased, being now only ten degrees in every direction. An operation was therefore performed, with very good results, for the field has increased remarkably, being larger than when we first saw the patient. The tension has also remained very low.

Summing up the results in our small series: Three cases gave very good results, in that the tension has stayed down at a safe level, with no changes in the field. Two more cases had good results when the glaucosan was used, but they live at a distance from the city and the use of the drug is so irregular that I do not like to include them in the good results because of lack of follow-up. In two other cases the results were temporarily very good, with rapid drop in tension, but the tension did not stay low. Two cases apparently had untoward results. We only had an opportunity to use aminglaucosan once. In this case, in an acute attack, I saw the patient early in the morning with an eye practically stone-hard. Seven per cent aminglaucosan was instilled twice at a two hour interval, and pilocarpin and eserin were used every hour. By evening the tension was fairly soft, so that the result was satisfactory.

Conclusions: (1) In our cases of glaucoma simplex, levoglaucosan always brought the tension down.

(2) In some cases, after its use, miotics again became effective.

(3) There seems to be some possibility of its causing a rise of tension, so the patient should always be under observation.

Medico-Dental building.

PULSATING EXOPHTHALMOS

Case report

DE WAYNE HALLETT, M.D., F.A.C.S.

NEW YORK

Twelve days after an automobile accident, bruit developed, and sixty-three days after the accident a diagnosis of pulsating exophthalmos was established. Ligation of the common carotid at the end of ninety days was immediately followed by complete hemiplegia, which subsided within four days. Bruit returned on the 104th day, the ophthalmic vein was ligated on the 133rd day, and resulting cessation of bruit was followed by neuritis with partial atrophy of the opposite arm and foot. These symptoms improved but the optic nerve atrophied.

The infrequence and the distressing symptoms of arteriovenous cavernous aneurism make it appropriate that each case be reported in detail.

The following case (Mrs. N. F. Q.) was, by permission, reported in abbreviated form by Dr. John M. Wheeler in a paper on this general subject read before the Pennsylvania State Medical Society in October, 1927.

In brief the history is as here given:

November 1, 1926, a traumatism. A bruit developed after twelve days. Diagnosis was made after sixty-three days. Physical rest was the treatment for the following twenty-one days. Common carotid ligated at end of ninety days. There was an immediate complete hemiplegia, which subsided within four days.

Bruit returned on the 104th day. The superior ophthalmic vein was ligated on the 133rd day. Bruit then ceased but was followed by a neuritis with partial atrophy in the opposite arm and foot. Proptosis and chemosis were greatly increased following the second operation. At the end of one year the proptosis is absent, the optic nerve atrophic, the neuritis in arm and foot absent, and the muscles regaining tone and size.

More in detail the case is as follows:

The accident followed an automobile crash in which the patient, a nurse, suffered a slight lacerated wound and a severe contusion above the left eye. She was not rendered unconscious, and, though nauseated and dizzy, she helped the others. Being "on a case" she returned to her work. Twelve days later she noticed a noise synchronous with her pulse and all through her head.

An aurist diagnosed tinnitus, an oculist prescribed glasses, and she visited a neurological clinic without the real significance of the bruit being discovered.

On January 8, 1927, she visited me by reference of Dr. Joseph F. Doran, with the above history and presenting proptosis and chemosis of the least degree, vision normal, and a bruit easily heard over the eye, brow, and left side of the head. Pulsation could be plainly felt by the hand or ear placed over the eye. It ceased when the carotid was compressed. Following this diagnosis she was placed in bed for three weeks for physical and psychological effect. No digital compression was given.

Dr. George W. Roberts was called in consultation, she was admitted to the Fifth Avenue Hospital, and on February 1st the doctor ligated the left common carotid.

His description of the operation is as follows:

"The patient was anesthetized, the usual skin preparation employed, and an incision about two and one-half inches in length was made parallel to the anterior border of the left sternomastoid muscle, which was retracted outward, the deep fascia divided, and the upper border of the omohyoid exposed. The carotid artery and carotid tubercle were easily located; the arte-

rial sheath longitudinally incised and the artery freed throughout its entire circumference. An aneurism needle was passed from without inwards, and threaded with no. 2 tanned catgut, and the artery doubly ligated, the ligatures being about one quarter of an inch apart. The wound was closed with deep and superficial catgut sutures throughout."

The immediate effect was an entire absence of bruit, and also a complete paralysis of the right side, face, arm, and leg, and also speech. The patient was mentally dull. The proptosis and chemosis increased. On the following day power of motion was regained, beginning with the leg, and after four days she recovered from the paralysis except for the voice, which was difficult and limited to a husky whisper. Aphasia was evident. The protruding chemosis was treated with vaseline, a dressing wet with a five per cent solution of magnesium sulphate, oiled silk, and local heat. The globe was displaced downward and outward.

After ten days the chemosis and proptosis were considerably reduced, with a return of fair mobility. The media and fundus appeared normal. The patient could not recall her home address, and used the wrong word to express her thought, but wrote correctly at dictation. At the end of fourteen days the bruit returned in a light blowing form observed only at the angle of the orbit. It ceased upon carotid compression. Obviously there was a slight return of patency in the artery. At the end of the third week, the chemosis was absent. The bruit was also observed to cease when the half-inch rubber tip of a stethoscope was firmly pressed against the upper inner angle of the orbit. There was a proptosis of three mm.

On February 24, 1927, a consultation was held with Dr. John M. Wheeler and Dr. Ralph I. Lloyd. The patient then left the hospital, and at home remained mostly in bed but was permitted to sit in a chair and to go to the bath room. At the end of the seventh week she was physically stronger; was permitted a walk of two city blocks, the appearance of the eye was nearly normal, and the voice husky. She could not maintain a train of thought and had difficulty in finding the correct word. The fundus of the eye seemed normal. Vision was 10/30.

At the end of the tenth week the aphasia was less marked, the voice stronger, the mentality improved, and the eye still appeared nearly normal, but the bruit increased upon physical exertion. She was readmitted to the hospital and Dr. Roberts ligated the superior ophthalmic vein at the angle of the orbit.

The details of this operation were as follows: The skin incision was from a point three mm. above the inner canthus, curving twenty mm. upward along and just above the margin of the orbit. Blunt dissection inward and through a fascia, exposing numerous dilated veins, three of which were doubly ligated and severed. After the operation the sterile stethoscope was applied to the region. There was no bruit present.

The following day there was great chemosis and proptosis, but no paralysis or mental defect. The local treatment was as before. At the end of the eleventh week (April 18, 1927) one week after this operation, the protruding chemosis overhung the lower lid ten millimeters. The cornea was clear and the pupil small.

At the end of the twelfth week (April 25, 1927) the patient began to experience a twitching in the toes of the right foot. The chemosis was now twenty mm. wide. About this time she returned to her home. By the end of the thirteenth week (May 2, 1927) she began to have twitching pain in the back of her right arm. Dr. Joseph Byrne diagnosed these twitchings as due to a neuritis, caused by secondary brain anemia consequent upon ligation of the carotid. At the end of the sixteenth week (May 23, 1927) the voice was better, the aphasia absent, the chemosis and proptosis lessened, but the arm was painful and was difficult to raise, and both it and the leg showed

1. Mrs. N. F. Q., April 13, 1927, 10 weeks after ligation of common carotid.

2. Mrs. N. F. Q., April 23, 1927, 10 days after ligation of superior ophthalmic vein.

3. Mrs. N. F. Q., May 28, 1927, 45 days after ligation of the superior ophthalmic vein.

4. Mrs. N. F. Q., March 20, 1928, 14 months after ligation of the carotid, and 11 months after the vein.

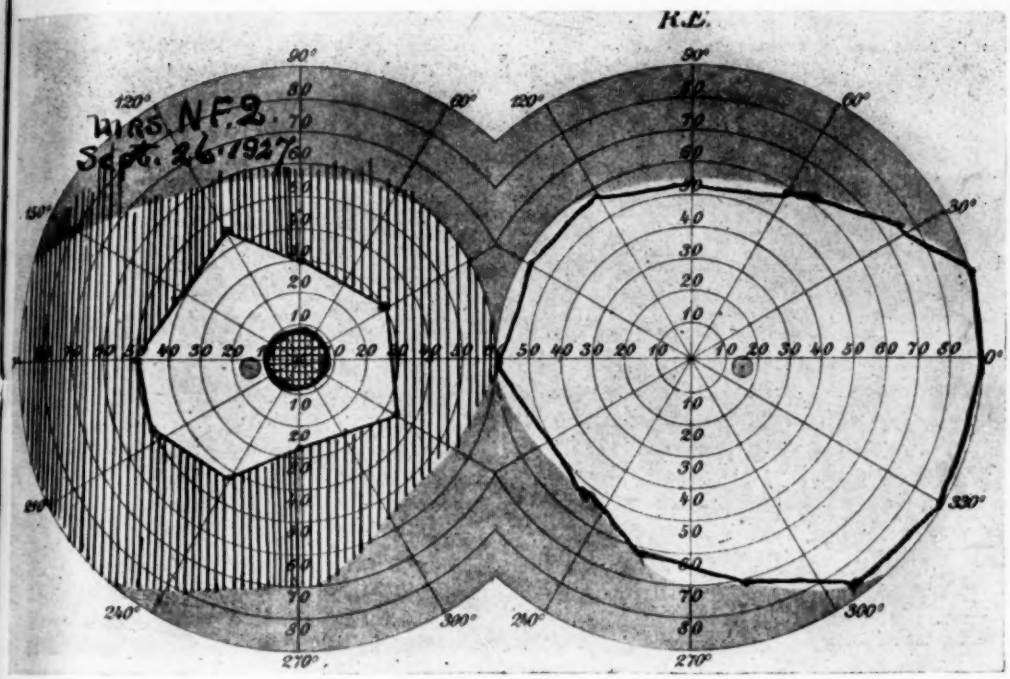


Fig. 5 (Hallett)

muscular atrophy. The foot inverted. At the end of the twenty-first week (June 27, 1927) the chemosis was absent, the proptosis very slight. The arm and foot were unchanged. At the end of the thirty-ninth week (September 19, 1927) the eye was of nearly normal appearance, the arm still painful, she could not raise it to her head, the toes no longer twitched, the foot inverted, the arm and leg were atrophic, the voice and the mental condition were normal.

On September 26, 1927 (the fortieth week) the mobility of the eye was nearly normal, the pupil slightly dilated, and the reaction to light imperfect. The optic disc was pale and slightly depressed. Vision 10/200. The field of vision was much contracted, and an eight degree central scotoma was present.

On February 20, 1928 (a little over a year from the date of carotid ligation), the eye remained as above stated. There is no bruit. The arm is no longer painful and has improved in power and size; and the patient begins to feel that she may presently resume her occupation as a nurse.

274 West Eighty-sixth street

NONCOMPENSABLE VISUAL DEFECTS IN INDUSTRIAL OPHTHALMOLOGY

GEORGE R. MCAULIFF, M.D.

CHICAGO

In five thousand consecutive patients in the routine practice of industrial ophthalmology, a study was made of the incidence of various types of pathology and of refractive error. Visual defects were found in 1,142 cases. The advisability of complete examination prior to employment is stressed, to protect the workman, to increase industrial efficiency, and to detect ocular pathology while still amenable to treatment. Read before the Chicago Ophthalmological Society, March 19, 1928.

This survey of noncompensable visual defects is based on a review of the results in five thousand consecutive unselected patients treated in the routine practice of industrial ophthalmology during the past eighteen months; and it is presented for the general interest of a statistical analysis of the working man's ocular condition and also to offer recommendations to those most interested in this work.

To correlate the findings it is necessary to know that these patients were of all nationalities and localities, with a predominance of urban population. For the most part, they were in early manhood and were actively engaged in somewhat hazardous occupations which exposed them to special risks, the older men being employed in positions such as that of watchman. These men were mostly unskilled, then came those more skilled in mechanical lines, and only a minority were of the clerical class in which major accidents are obviously uncommon. From the above, it can readily be understood why defects were more common than in an equal number of private patients of higher social rank and why refractive errors had so often remained uncorrected. These remarks are relevant to an attempt to point out the factors involved in an evaluation of the results found.

Visual defects were observed in 1,142 patients and will be classed according to their essential cause, firstly as pathological and secondly as refractive. In the latter group are included only such cases as were frankly noncompensable, ruling out all those in which a visual defect might be due to the accident in question.

Ocular pathology was the cause of visual impairment in 265 patients, corneal involvement leading with ninety cases. Leucomata from former injuries or ulcers were observed in sixty-three patients, the vision being between 20/25 and 20/30 in five cases, between 20/40 and 20/50 in nine cases, and 20/65 or more in the remaining 49.

Trachomatous conjunctivitis complicated by corneal opacities and pannus was seen in twenty-two patients. While these were involved to some extent bilaterally, they had fortunately not all advanced to the point of binocular visual impairment, but they would undoubtedly do so if allowed to remain untreated. Five of these showed a decrease to between 20/30 and 20/50, while the other seventeen all had 20/65 or below. Pterygium appeared in five cases, four of which had monocular vision of 20/65 or less, and the other had 20/40. Hence, of these ninety workmen, seventy had sufficient impairment to render them almost monocular.

Lenticular opacities were observed in forty-four patients. In seventeen there were monocular incipient cataracts, with vision reduced in six to between 20/30 and 20/40, in the other eleven to between 20/40 and 20/50. Bilateral incipient cataracts were found in eleven men, six of whom had vision lowered to 20/50. Mature senile monocular cataracts were present in seven cases and old traumatic cataracts in nine others. Taking 20/50 as an arbitrary standard for useful vision,

sixteen of these forty-four lenticular cases showed sufficient impairment to be virtually monocular.

Iritis of varying etiology was fairly frequent, but in only five cases was there persistent exudate which interfered with vision. In three the vision was between 20/25 and 20/40, while in the other two it was reduced below 20/300 because of a tuberculous iritis and a sympathetic iridocyclitis respectively.

Choroidal pathology was evident in forty patients. Chorioretinitis was found in thirty-two cases, due probably to lues but not so proved. Ruptured choroid was seen in thirteen patients, coloboma in three, and a melanosarcoma in one. In all the vision was so impaired as practically to cause monocular blindness.

Retinal involvement appeared in twenty-one men. Six showed detachments, four had neuroretinitis, four hemorrhagic neuroretinitis, one retinitis pigmentosa, four albuminuric retinitis, and three embolism of the central retinal artery. Degenerative optic nerve changes were seen in fifteen patients, ten of whom had a primary atrophy, three a neuritis, and two a toxic amblyopia. Each had markedly lowered vision.

Glaucoma was found in eight cases, all of which showed some degree of bilateral involvement, while in those more affected eyesight was already destroyed. This demonstrates very vividly the end result of ignorance and neglect.

Miscellaneous factors responsible for visual defects total fifty. Phthisis bulbi accounts for thirty-four, enucleation fifteen, and vitreous hemorrhage one.

Summing up the above figures shows that out of 265 cases 189 had visual impairment sufficient in degree to classify them as monocularly blind. Were this same series to be reviewed again in a year, there would undoubtedly be an increase in the pathology found, as the glaucoma, trachoma, cataract, and optic atrophies will progress, with a corresponding fall in vision of the better eye.

Refractive errors sufficient in amount to cause faulty vision were found in 876 cases. A manifest refraction was usually the method employed in determining these errors, as the prime object was to discover quickly the cause of the defective vision and not to examine each patient carefully with the idea of a future prescription for glasses. When necessary, examination was carried out under homatropine. Had this been done as a routine measure, undoubtedly many latent errors would have been discovered, but even though found they could be disregarded as not being high enough to cause visual defects.

Other inaccuracies resulted in illiterate patients who were mentally unable to comprehend what the chart was all about. A further point to remember in recording vision in such cases is that the reading for the injured eye is necessarily inexact, for under such conditions it will not show its true visual acuity. Hence, the vision of that eye under normal conditions must be considered similar to that of the uninjured eye, an admittedly faulty assumption but an unavoidable one as the necessity of earning a living precludes later visits by these men for scientific ocular investigation.

Hyperopia accounted for 390 defects, the vision being between 20/25 and 20/30 in 135 patients, between 20/40 and 20/50 in 124, and 20/65 or over in the remaining 131. Thus we see a preponderance of the lower errors. Amblyopia ex anopsia occurred thirty-one times in the higher errors, and with these exceptions all the above patients could be corrected to useful vision. Convergent squints were found in four of these men and alternating squints in three.

Hyperopic astigmatism was present in 239 patients. The error was 20/30 or below in forty, between 20/40 and 20/50 in eighty-eight, and 20/65 or over in the remaining one hundred and eleven. These could all be corrected except as to fifty-three cases of amblyopia ex anopsia. Convergent squint occurred in nine of these cases.

The hyperopic groups contain eighty-four patients with eyes which practically are industrially blind. One noticeable thing in the hyperopes is their freedom from subjective symptoms commonly present with such refractive errors. Possibly this is due to an overshadowing of such symptoms by the pain of the present injury, partly to their complete absence, because as laborers these patients are not subjected to the eyestrain of constant close work encountered by clerical workers. Perhaps also this may illustrate the well known fact in evolution that with increasing intelligence and refinement of the nervous mechanism there comes a heightened sensitivity to pain. From the comparative infrequency of subjective symptoms it is also natural that glasses are seldom worn, the proportion wearing them being probably not more than twenty per cent.

Myopia was the etiologic factor of defective eyesight in 123 men. The error was between 20/25 and 20/30 in thirteen, from 20/40 to 20/50 in thirty-four, and 20/65 or less in seventy-six cases. Defects attributable to myopic astigmatism were found in eighty-five patients. Here the error was 20/30 or below in sixteen cases, between 20/40 and 20/50 in twenty-four, and 20/65 or above in forty-five. In contradistinction to the hyperopic group there was here a majority of the higher errors. In the myopias fifteen men had divergent squint and eleven showed conus and choroidal changes, so that of 208 patients twenty-six were so amblyopic as to be considered almost industrially blind. The myopes were wearing glasses in greater numbers than the hyperopes, but the proportion did not exceed forty per cent, and several cases were striking because of their exceedingly poor uncorrected vision.

Mixed astigmatism was found in twenty-nine men. In nine the error was 20/30 or below, in seven between 20/40 and 20/50, and in the others 20/65 or less. All except three could be corrected to useful vision, these being classed as cases of amblyopia ex anopsia. Anisometropia occurred in ten patients, all of whom could be improved by glasses.

In reviewing the 876 refractive errors, it is found that 113 patients had virtual monocular amblyopia.

The relationship of eye accidents to defective vision is theoretically easy to solve, as they should run more or less parallel, but in practice it is not so easy to determine. It is rather infrequent for patients to return because of second accidents. Certainly some must suffer additional injuries, but these may be treated at the plant first aid stations or elsewhere, as I never see them. Possibly a man with poor eyesight consciously or subconsciously acquires greater caution to compensate for his defective vision. At times a man is injured, regardless of his vision, by the carelessness of fellow workmen. Such factors indicate the difficulty involved in trying to establish a connection, if any, between injuries and poor eyesight. Nevertheless it stands to reason that impaired vision renders a man at least potentially if not actually more prone to accidents.

By combining the pathological and refractive cases, it is found that of five thousand patients, 1141, or 22 per cent, fell in one of these groups. Such a percentage demonstrates the advisability of a complete physical examination prior to employment, for, everything considered, no employer would willingly assume an added unnecessary risk were it avoidable.

Compulsory examination should be made with the underlying idea of protecting and safeguarding the men. At the present time such surveys are possible for the larger and wealthier companies, which insist on a visual examination and aid the prospective employee in every manner to meet their requirements, but for the smaller employer this plan is not so feasible, for several reasons. In some jobs the work is so unattractive, the pay so small, and labor so scarce that visual defects are too easily disregarded.

The growing popularity of preëmployment examination is evidenced by

the statistics published by the National Industrial Conference Board. Before 1910 only twenty plants had surveys, but by 1926 a group of 517 industrial establishments employing a total of over a million men recorded complete physical examinations. Nevertheless, certain organizations are vigorously opposed to such a plan and at times practically compel companies to employ a man regardless of his visual acuity. For example, I cite a man with uncorrected vision of only 10/200 employed as a structural steel worker, exposing not only himself but also his coworkers to fatal accidents by reason of his very defective eyesight. No valid objections to eye examinations have been presented, while the advantages are many.

A man with corrected vision would be a better workman, with greater earning power. Ocular pathology might be detected in a stage still amenable to treatment. A communicable disease like trachoma could be discovered and prevented from spreading. To an employer would accrue the benefits of increased efficiency in his organization, with fewer accidents and less interruption of work. The insurance carrier would profit in assuming less risks and hence paying fewer major claims, while a reduction in premium rates would become possible. Furthermore, false attributions of past and noncompensable visual defects to the present accident would become rarer, with a decrease in the number of law suits of such character.

No life insurance company will issue a policy without a physical examination, nor will a company insure precious stones without an appraisal value. We carefully inspect machinery and equipment, but neglect our man power and often employ anybody without even the pretense of a physical examination.

Visual surveys should be conducted by competent oculists rather than by concerns whose primary object seems to be to sell glasses which are frequently incorrect and unnecessary, and whose representatives are not professionally qualified to make an examination thorough enough to diagnose real pathology.

25 East Washington street.

A NEW OPERATIVE PROCEDURE IN CASES OF SHALLOW ANTERIOR CHAMBER

WILBER F. SWETT, M.D.

SAN FRANCISCO

To avoid the necessity for using scissors in opening a shallow anterior chamber, a small incision is first made with the Graefe knife, and through this incision a spatula is carried across the face of the iris, after which the full incision is made with the Graefe knife, the spatula holding the iris out of the way.

The use of scissors in enlarging an incision into the anterior chamber has always seemed to me a very crude method. At best it ends in delayed healing, and frequently in more or less severe iridocyclitis, or even more serious complications.

For these reasons I decided to find a technique for the use of a knife in cases of shallow anterior chamber.

The use of a Graefe knife in such an emergency was first suggested while operating on a cataract case complicated by having no anterior chamber at the time of operation. Since then I have applied the technique to a number of cases in which the anterior chamber was too shallow to allow the knife to be introduced in the routine manner.

I shall describe the procedure on an eye with so shallow a chamber that

the standard incision is impossible, but the same technique can be applied to operative complications in which the operator usually resorts to the use of scissors to enlarge the primary incision.

The primary incision into the anterior chamber resembles the peripheral incision in an anterior sclerotomy, except that the incision is completed, leaving no bridge.

A Graefe knife is held as in cataract extraction, and the point thrust through the sclera just above the horizontal meridian one millimeter outside the limbus and parallel to the surface

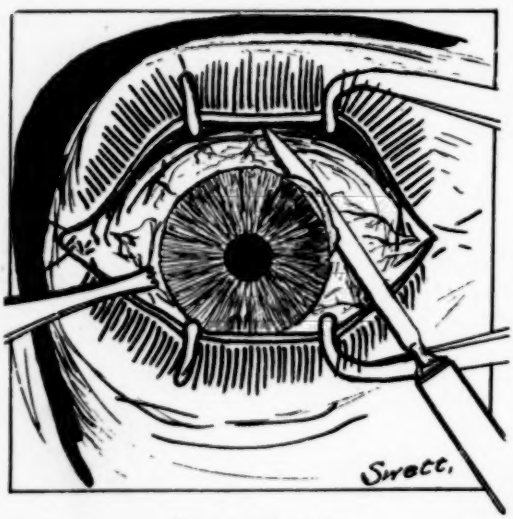


Fig. 1 (Swett).

of the iris. Entering the angle of the chamber, it is carried along in the angle about four millimeters, then out of the sclera, and the incision is completed, making a cut just large enough to allow a flat spatula to be introduced. (Fig. 1.)

The length of the incision being short, there is little or no iris prolapse, but if it occurs a reposition can be easily done.

A long, flat, moderately wide spatula or repositor held in the plane of the iris is now introduced into the chamber, the eye being fixed with the other hand, is passed gently along with its rounded end guided by the angle, and is stroked very gently toward the pupil until it has traversed the entire diameter and lies across the anterior chamber with its end slightly below

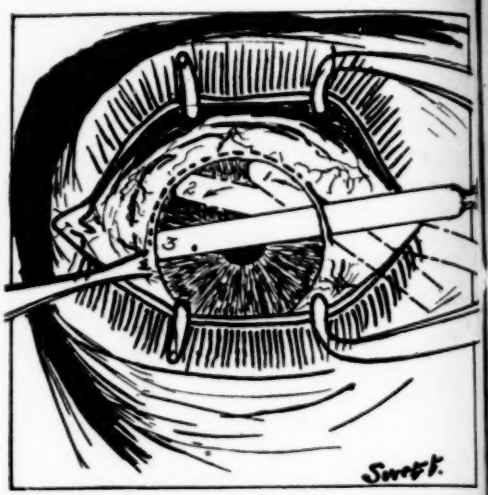


Fig. 2 (Swett).

the mid line. By this procedure the iris and lens have been gradually forced backward behind the plane of incision, and the anterior chamber reformed. (Fig. 2.)

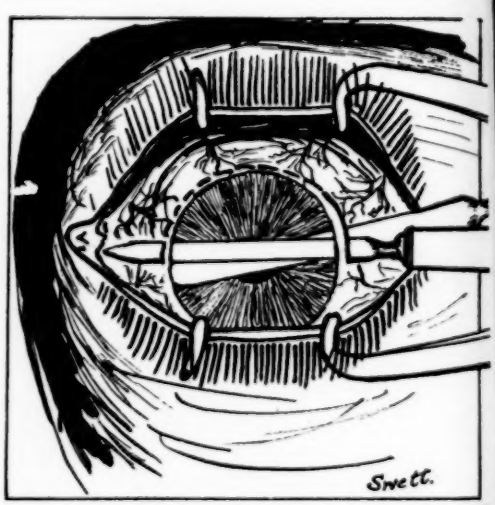


Fig. 3 (Swett).

The inner end is carried just so far below the mid line that the handle of the repositor will not interfere with the manipulation of the knife.

The Graefe knife is now introduced, its point being slid along the surface of the repositor, the counterpuncture made at the usual point, and the incision completed upward. The completed incision is exactly as if it had been done with a normal chamber.

When the spatula is in position with its blunt end in the opposite angle, there is enough pressure on it from the lens and iris to afford ideal fixation, and the incision is made with ease.

There is no injury to the iris or lens, and when the spatula is removed the normal cataract relations are found.

Most of us have probably at some time been unfortunate enough to have the iris come forward and obstruct the knife by folding over the blade. To continue means at best a huge ragged iridectomy, if the severe pain does not cause the patient to squeeze and ruin his eye. In such complications in the past I have rapidly withdrawn the blade and have allowed the anterior chamber to reform, but I now find in the above technique the means to a perfect incision.

693 Sutter street.

NOTES, CASES, INSTRUMENTS

ORBITAL INVOLVEMENT FROM NASAL SINUS DISEASE SIMULATING CAVERNOUS SINUS THROMBOSIS

H. Maxwell Langdon, M.D.

PHILADELPHIA

Thrombosis of the cavernous sinus is a condition so hopeless in the majority of cases that any condition which simulates it should be recorded for the sake of the differential diagnosis. The present case in its early stage strongly suggested the possibility of such a condition.

Miss M. A. B., aged thirty-nine years, a school teacher, saw Dr. Leavitt on March 9, 1928, with the history that for two days previously she had suffered from symptoms of a grippe infection, headache, general malaise, chills, sore throat and coryza.

Examination showed a temperature of 102 degrees, a profuse mucopurulent nasal discharge, and an intensely congested throat with a purulent membrane in the pharynx which did not cover the faucial tonsils. A culture from this was negative for diphtheria. Her temperature ranged between 99 and 102 degrees.

On March 13th the patient complained of pain in the right side of the head, which seemed most intense in the right temporal region and in the distribution of the upper and middle branches of the right trifacial nerve. On March 14th there developed a paralysis of the third cranial nerve with ptosis, outward deviation of the globe, and some exophthalmos. There was no pulsation of the globe, but there was pain on pressure. Her temperature was 103 degrees, with mental confusion and at times delirium. The leucocyte count was 10,050. She was taken to the Orthopædic Hospital where she was seen by Dr. Wood and myself.

Dr. Wood's report on March 16th was as follows: "Left nasal fossa is free. Septum slightly deviated to the right. Posterior fossa is completely blocked by swollen turbinates with much purulent secretion oozing between them and the septum. After treating with cocaine most of the secretion was gotten from under the middle turbinates. Thick yellowish mucus in the pharynx showed hemorrhagic streaks. Probable right ethmoid and antrum infection. Condition of sphenoid could not be determined. Suspicious of orbital abscess."

On the same day I found the right lid ptosed, but it could be opened about

four mm. The eye was proptosed four mm. The globe was rotated out, but could be moved slightly in all directions. The pupil was active, the media clear, the disc normal in color with some blurring of the nasal margins, the veins fuller, darker and more wavy than those of the left eye. The diagnosis lay between orbital cellulitis, abscess, and thrombosis of the cavernous sinus.

X-ray examination by Dr. Bromer showed definite increase in the density of the right antrum and ethmoid as compared with the left, the frontals small but seemingly clear, the right naris almost occluded by enlarged turbinates, and "no doubt of the infection of the right antrum and ethmoid".

Dr. Wood continued his intranasal treatment, washing out the antrum twice, but no more formal operative work was done. There was steady and rapid improvement. By March 19th, four days after the severe onset of ocular symptoms, the ptosis of the right lid and the exophthalmos had almost disappeared. There was still slight loss of upward rotation, with some diplopia in the upper field. Other motions were full, with no diplopia elsewhere. The fundus picture was unchanged.

On March 21st there was complete absence of diplopia and the retinal veins of the right eye were less engorged.

A note by Dr. Wood on March 23rd says: "Washed a great deal of pus from right antrum. She has made a complete recovery."

For twenty-four hours the chances seemed about evenly divided as to whether or not the condition was the early stage of a cavernous sinus thrombosis. The only definite sign of such a condition which was not present was an edema situated over the right mastoid, and this sign is not always present early. The patient did have all the local intraocular and extraocular signs, in addition to the temperature, the sudden onset after an infection, and the mental perturbation.

1530 Locust street.

DISCIFORM MACULAR DEGENERATION*

BEULAH CUSHMAN, M.D.
CHICAGO

The case here described seems quite typical of disciform degeneration of the macular region, as described by Paul Junius and Hermann Kuhnt in their monograph on "die scheibenformige Entartung der Netzhautmitte", 1926. They describe this condition of the macula as a form of degeneration and try to group the conditions which have been described as definite entities, Fuchs's retinitis circinata, Leber's degenerative exudative retinitis, Coats's exudative retinitis, and Feingold's senile exudative macular retinitis, as steps in the same process. In the monograph drawings and pictures are given to show the different steps in the several cases.

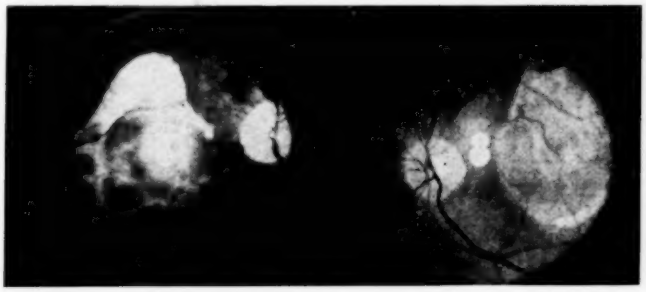
Case: Male, aged 69 years, German, came to Dr. Suker's clinic at the Postgraduate Hospital because of failing vision. History of eyes: Was struck in right eye fifty years ago, and vision in this eye has never been so good since that time, but previous visual acuity cannot be ascertained definitely. Vision in left eye always good until it began to fail quite rapidly six months ago: now he cannot see to read. No pain or redness at any time. General health has always been very good, and general examination negative, as reported by family physician at this time.

Examination of eyes: R.V. 6/200. No improvement with lenses. L.V. 8/200, +1.50 cyl. ax. 180°, improves to 10/200 in L.E. Pupils react to light and accommodation. Tension normal. Anterior halves of eyes normal in all appearances with ophthalmoscopic and slit lamp examinations, except for few opaque spots scattered through the senile cortex. Fields apparently normal for form, but difficult to be accurate because of poor fixation. Right eye, no vitreous floaters.

* Read before the Chicago Ophthalmological Society, April 16, 1928.

In the region of the macula is a definite disc-shaped yellowish gray area well outlined and quite prominent, and with bands that extend toward the disc and temporally. The mass shows areas of scattered grayish pigment, and a few patches of darker pigment. Fine retinal vessels extend over mass, pigment, and bands. The disc is clearly defined, the arteries are attenuated and irregular in caliber, the veins dilated and nicked by the arteries. The small retinal vessels appear as beaded. Immediately around the disciform area there are irregular areas of net-like changes below, extending from the mass, which show up quite clearly in the picture.

Left eye, disc outline distinct. A scleral pigment ring, which is rather blurred and broken, completely surrounds the disc. Arteries are small, tortuous, and irregular in caliber. The veins are dilated and irregular in caliber. In the macular region there is a disc-shaped yellowish gray mass, which is quite flat, with fine vessels over it, and the appearance of some apparently new-formed blood vessels in its center. The mass is rather well defined, with grayish pigment spots scattered throughout. A few definite areas of darker pigment are scattered over the mass. In the area of the new fine blood-vessel formation there is a pin point hemorrhage. The lower edge of the macular region is outlined by a very bright yellow streak, which extends for about two disc diameters around the edge of the yellowish mass. The rest of the fundus is somewhat blurred, with the blurring of the choroidal pigment, but no definite lesions. The media are clear, with no vitreous floaters.



Illustrating Cushman's case of disciform macular degeneration. (Photographs by Dr. Von der Heydt.) At the left side is the right fundus, with vision of 6/200, and at the right side is the left fundus, with vision of 10/200.

The condition in each eye seemed clinically to be entirely degenerative, rather than due to inflammatory change.

25 East Washington street.

PARINAUD'S CONJUNCTIVITIS*

RAYMOND A. TOMASSENE, M.D., F.A.C.S.

WHEELING, WEST VIRGINIA

On December 14, 1927, while treating Mr. J. J. in my office for a low grade sinus infection, he spoke to me regarding his daughter J. J., aged twelve years, whom the family physician had reported as having mumps. He had observed a slight swelling of his daughter's left eye.

Examination that night at her home revealed a moderate swelling of the preauricular and cervical nodes on the left side, with some tenderness. The left eye was slightly congested, and both lids were swollen. The conjunctiva was greatly engorged, the upper fold showing a fairly large granulation with a yellow point of beginning necrosis and several large follicles. There were several other flat granulations arising from the tarsal conjunctiva on the lower lid. No corneal involvement. No constitutional symptoms. Application of weak silver solu-

* Read before the West Virginia State Medical Association, May 23, 1928.

tion was started. Several days later the condition was about the same.

Blood picture at this time showed red blood cells 4,570,000, hemoglobin 100 per cent, white blood corpuscles 6,400, polymorphonuclears 59 per cent, small lymphocytes 33 per cent, large lymphocytes 5 per cent, eosinophiles 2 per cent, transitionals 1 per cent.

Smear from eye negative for acid-fast bacilli. No leptothrix by our method.

Smears and cultures from the secretion showed no organisms. I had the laboratory look carefully for bovine tubercle bacilli, because the father had charge of the beef department of a large packing house and informed me he was daily seeing lesions of this character. It occurred to him that he might have carried the invading organism home.

Guinea pig inoculated on February 1, 1928, with fluid and scrapings from conjunctiva. Frequent blood counts were made, but the picture was essentially the same as reported. No eosinophilia. On February 7, 1928, the preauricular gland broke down and was incised by the family physician. A direct smear of the gland contents revealed distinct acid-fast bacilli. Pus from gland was injected into a second pig.

February 20, 1928. Conjunctiva granulating nicely, necrotic area all gone. Is using two per cent mercurochrome drops in eye, along with daily application of tracumin five per cent an liver oil internally.

Tracumin ophthalmic, Athenstaedt, is a German preparation.† The eye started to improve as soon as I began to use this preparation, which was in about the third or fourth week. The case was under my observation for almost three months. The condition generally gradually cleared up, leaving only a pallor of the conjunctival folds. The incised gland healed up very nicely. At no time was there any corneal involvement.

The pathologist at the Ohio Valley General Hospital made the following report: Washings and curettings from left eye were injected into a guinea pig. At autopsy the spleen and liver were found to present lesions grossly typical of tuberculosis. On February 9, 1928, direct smear from pus of cervical gland showed acid-fast bacilli. Autopsy of guinea pig injected showed gross lesions typical of tuberculosis.

Wheeling Bank and Trust building.

† From J. Doak and Company, Philadelphia.

SOCIETY PROCEEDINGS

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

March 20, 1928

DR. W. HOLBROOK LOWELL presiding

Central scotoma in tabes

DR. J. HERBERT WAITE presented a patient aged fifty years, showing central scotomas of both eyes. In January, 1928, provisional diagnosis was made of toxic amblyopia, as he had been using tobacco and alcohol to excess. Vision had progressively failed in each eye since October, 1927, when he had changed his "bootlegger." On January 16, 1928, vision of both eyes was 20/100 unimproved. The right pupil was three mm., irregular, fixed to light; the left pupil was four mm., regular, reacting to light. Both pupils reacted promptly to convergence. The fundi were normal except that both discs showed primary atrophy. The visual fields showed central scotomas of both eyes, absolute for colors, relative for white. With a small test object a defect appeared in the temporal quadrant of the right field. The blind spots were normal. Color perception

was everywhere defective. X-ray showed several abscessed teeth and thickened membrane in both antra. Blood Wassermann was four plus, the spinal fluid positive. There was no ataxia, but the knee jerks were slightly diminished.

The characteristic Argyll Robertson pupils, with color and form visual field defects which had not improved during two months' observation, and with perfectly definite optic atrophy, associated with strongly positive Wassermann in blood and spinal fluid, made this case seem to be one of tabetic optic atrophy with central scotoma, in spite of the fact that other signs of tabes were lacking. It was well known that there were two types of tabes, one in which ataxia appeared first and dominated the picture, and the other in which optic atrophy appeared first. The one set of symptoms might precede the other by many years. When optic atrophy preceded ataxia the prognosis was bad, because the vision usually failed progressively in spite of treatment. Fortunately, in the six to eight per cent of tabetics who developed optic atrophy, only one case in fifty (Uhthoff) showed central scotomata. If the visual defect were due to toxic amblyopia, one would not expect to find defects in the peripheral field, nor defective color perception (assuming that the patient was not color blind), nor Argyll Robertson pupils. This patient, furthermore, had not improved on discontinuing tobacco and alcohol.

Exophthalmos with bruit

Dr. S. J. McDonald showed a woman with blood pressure 240-110 who had developed exophthalmos of seven mm. in the right eye. Vision was 20/40, with normal fundus. X-rays were negative. A loud bruit was heard over the right globe and forehead. Diagnosis of aneurysm was made and ligation of the carotid advised.

Magnet operations

Dr. Walter B. Lancaster, who illustrated his remarks with demonstrations on pigs' eyes, said the first magnets to be used were permanent magnets. These were too feeble for effective use, although some successes were achieved. When electromagnets were introduced a great step forward was made. These, however, depended for their current on small wet batteries the voltage of which was not sufficient to produce a powerful magnet. As a result, the proportion of successes in the early days was small. Even if the foreign body was removed the operator too often did irreparable damage to the vitreous by random probing in search of the foreign body, the exact location of which was unknown. The accurate localization which followed the application of the x-ray was again a great step forward.

Another great improvement was the increased power which came when the electric lighting current became available for magnets. With these stronger magnets it was possible to get the foreign body out if the tip of the magnet came within two or three millimeters of it. It was not necessary, in other words, to hit the bull's eye, as it was with the weak magnets.

A still greater step forward was made when magnets were designed of sufficient size to draw off the foreign body from a distance of ten to twenty millimeters. It became possible to extract most foreign bodies without introducing a magnet tip into the vitreous. There had been some conflict of opinion as to which was the better policy, to wait and get a good localization by x-ray, or to go ahead and extract if you could without localization. It was obvious that the longer the foreign body remained in the eye the more likely it was to set up inflammation, the more firmly it was imbedded in exudate, and the harder it was to remove. It was rarely possible to extract a foreign body which was imbedded in exudate with the magnet acting at a distance of ten to fifteen millimeters, but if the foreign body was dealt with within a few hours of its introduction it was very frequently possible to draw it to a point of election, and this could be done with-

out exact knowledge of its location.

The first point of election was in front of the lens, preferably in the anterior chamber. The second point of election was some convenient place just posterior to the ciliary body, for example, down and out. With a large magnet it was usually possible to obtain such a location. Unless the foreign body were very large it could be drawn around the lens without injury to the lens capsule. If it were behind the iris in front of the lens it could be extracted with a small magnet through an incision made at the angle of the anterior chamber opposite the foreign body.

S. J. BEACH,
Secretary.

BALTIMORE MEDICAL SOCIETY

Ophthalmological and Otolaryngological Sections

March 29, 1928

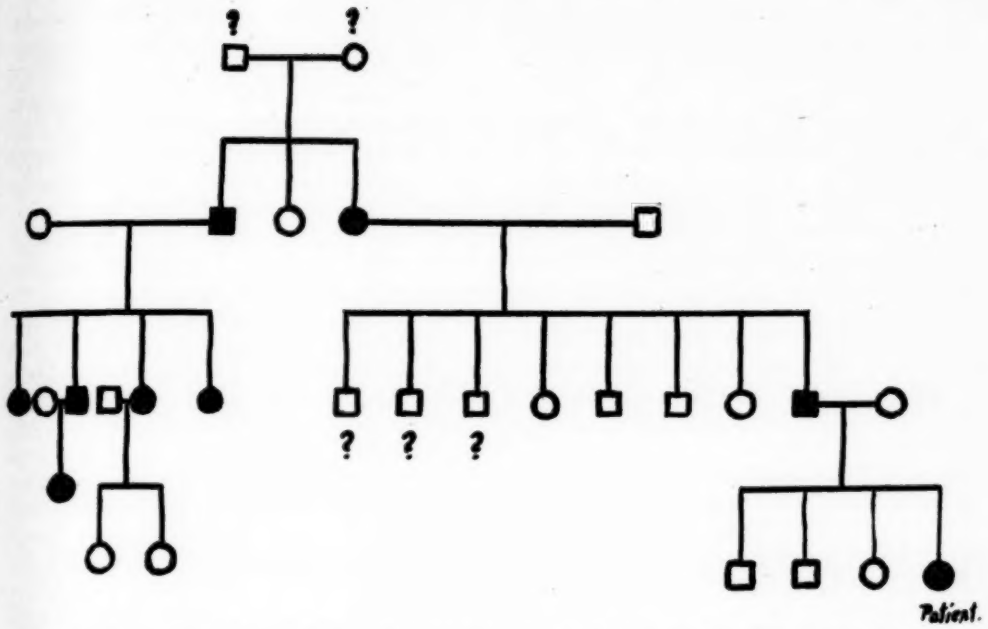
DR. J. S. FRIEDENWALD, chairman

Massive gliosis of the retina

DR. HARRY FRIEDENWALD presented the case of a white girl, aged sixteen years, who had had an injury to the left eye with a blunt object at the age of two years. Since that time the eye had been blind but never painful or irritated. In August, 1927, the patient noticed a white spot in her eye. She was first examined in September, 1927, when a shrunken, calcareous cataract was found dislocated into the anterior chamber. This was extracted without difficulty. The postoperative course was uneventful except for a temporary elevation of intraocular pressure which was readily controlled with eserine. At the present time, the media were clear and the fundus could be well seen. Nowhere was there any normal red color. The whole fundus was occupied by an extensive fibrous white mass flecked here and there with blood pigment and traversed by numerous vessels which did not, however, follow the course of the normal retinal vessels. The optic disc could not be located. There was a thin-walled cyst far forward in the lower part of the fundus. The appearance was similar to that seen grossly in the pathological specimen of the case of massive gliosis of the retina reported by Dr. Jonas Friedenwald in the Jackson Birthday Volume, 1926.

Neurorelapsing luetic neuroretinitis

DR. HARRY FRIEDENWALD described the case of a white man of twenty-two years who had had a primary lesion in September, 1927. He had consulted his physician and had received six injections of salvarsan. After the sixth injection he had failed to return for further treatment. Three weeks later, while bending over, he had suddenly experienced the loss of one-half the visual field of the left eye. A few hours later the vision was entirely gone. He was first seen on the tenth day following loss of vision. The right eye was normal. The left eye was slightly congested, tension normal, media faintly hazy. Eyegrounds showed intense congestion and edema of the optic disc, great tortuosity of the retinal veins, extensive flame-shaped hemorrhages throughout the fundus, scattered masses of yellowish white exudation, and intense perivascular infiltrates. The condition rapidly became worse, congestion of the eyeball increased, and there was much pain. The media became too turbid for examination of the fundus. Both blood and spinal Wassermann were at first negative. A second blood Wassermann was taken and showed a four plus reaction in the ice box but negative reaction in the water bath. Intensive antiluetic treatment was instituted and the inflammatory reaction rapidly subsided. The media became clear within two weeks. At the present time, three months after the onset, there was an advanced postneuritic atrophy. The case was remarkable both for the severity of the intraocular reaction and for the short latent period between cessation of antiluetic treatment and the development of the ocular trouble.



Bilateral congenital paralysis of superior rectus (J. Friedenwald). Family tree.

Wood alcohol blindness with excavation of disc

DR. JONAS FRIEDENWALD told of a colored man, aged thirty-five years, who was on a drinking bout from November 1 to 5, 1927. On November 6 he felt no worse than he had after similar experiences, but on the seventh he was seriously ill with headache and nausea. In the morning his vision was not impaired, but at noon the sight began to fail, and in a few hours all light perception was lost. He was first seen on the following day, when he was mentally clear and showed no toxic constitutional symptoms. There was slight divergent strabismus, pupils dilated and fixed, slight congestion of the retinal vessels with slight edema of the retina about the disc. Chemical examination of the blood and urine revealed normal figures. Repeated lumbar punctures were performed without any improvement. Three weeks later the disc began to pale. At the present time the right optic disc was bluish white and showed a deep pseudoglaucomatous excavation with dipping of the retinal vessels at the margin of the disc. The left eye also showed a white disc but only a shallow depression. The patient had been repeatedly examined since the onset of his trouble and had never shown a rise in the tension of the right eye. Throughout the period of convalescence the patient had shown a most remarkable visual phenomenon. There was no light perception and no pupillary reaction to light. In spite of this, the patient was able to recognize hand movements before the left eye and to identify the direction of the motion. He was able to do this even when his face was shielded by a plate of glass from any air currents. He recognized the movements better in dim light than in bright light. No explanation of the curious visual phenomenon was offered. For a discussion of pseudoglaucomatous excavation of the optic disc following wood alcohol poisoning see Fridenberg, Transactions of the American Ophthalmological Society, 1910, v. 12, part 2, page 513.

Bilateral congenital paralysis of superior rectus

DR. JONAS FRIEDENWALD presented the case of a child of three years whose family history was represented in the accompanying diagram. Only the patient and her father had been examined,

and the positive cases in the family chart were based on the latter's statement. As far as could be learned from the father these cases showed ptosis rather than paralysis of the superior recti. The father had a complete left-sided congenital ptosis. The patient was a well developed child, aged three years, somewhat pigeon-toed, but otherwise normal on physical examination except for the eyes. There was a high hyperopia, convergent strabismus which had been corrected by glasses, and a fine rotatory nystagmus in each eye, the slow movement of which was clockwise in the left eye and counter-clockwise in the right. The patient was entirely unable to rotate her eyes above the horizontal plane, and showed in addition a partial bilateral ptosis. The eyegrounds were normal. Vision in each eye equalled 6/24 approximately.

Posttraumatic spasm of inferior oblique

DR. JONAS FRIEDENWALD described the following case: The patient was a healthy man, aged forty-six years, whose vision had always been good. He was a skilled mechanic by trade. One month ago, a shaving of steel struck him in the right eye, lacerating the lid slightly and lodging at a point just below the insertion of the external rectus. There was perforation of the sclera. The foreign body was removed and the wound was closed by a conjunctival flap. A slight intraocular hemorrhage had been rapidly absorbed and the eye was now free from irritation. Ophthalmoscopic examination showed only a small scar far on the temporal side. Vision was normal. Since the recovery of his vision, the patient complained of diplopia. There were five degrees of clockwise cyclotropia. The right eye turned upward and outward and the diplopia increased when the patient looked upward and to the right. The case was of interest in that the injury was at a good distance from the inferior oblique muscle. X-ray and clinical examination revealed no evidence of orbital injury, foreign body, or sinus disease.

Congenital syphilis with hypothyroidism and juvenile cataracts

DR. HARRY FRIEDENWALD presented the case of one of two sisters, both of whom had shown identical clinical history. They were small, underdeveloped, mentally retarded and had the facies of congenital luetics. Up to the age of eight years both had grown fairly normally, after which time their growth had been retarded. In early childhood both children's eyes were normal. Lenticular opacities first developed at the age of eleven years in the older girl, at the age of nine years in the younger girl, and in the former proceeded rapidly to maturity. There was definite evidence of hypothyroidism but no evidence of tetany. Both children were under treatment for congenital lues.

L. GOLDBACH,
Secretary.

ROYAL SOCIETY OF MEDICINE, LONDON

Section of Ophthalmology

March 9, 1928

MR. ERNEST CLARKE presiding

Parinaud's conjunctivitis

MR. P. G. DOYNE showed a patient who had received a blow on the eye, since which the eye had been inflamed and swollen. X-ray and bacteriological examinations were negative.

Discussion. MR. E. R. CHAMBERS mentioned a similar case in which he had used two per cent boric acid and irradiation with ultra-violet light to the whole body. In two months the condition had cleared up.

Tumor of the iris

MR. A. S. MACCALLAN showed a man aged thirty-six years with this condition. The patient's fundi were normal. The slip-lamp showed the tissue of the iris merged into a decolored mass. His own view was that it was a nevoid

growth of the iris; it did not appear to be a cyst.

Discussion. MR. HUMPHREY NEAME agreed it was probably nevoid. He suggested that an accurate measurement of it should be taken now and again in a few months time, as probably it was increasing, and he thought it would ultimately prove to be malignant. If it did enlarge, he recommended operation; he was not sure whether it could be removed by iridectomy.

MR. CYRIL WALKER referred to a boy aged sixteen years, who had had a lump similar to that in the case now shown. It grew slowly, and the speaker did iridectomy. There was very little pigmentation. For a month or two after that operation there was no trouble, but after six months there was a distinct recurrence in the angle. Mr. Treacher Collins, who saw the boy, said it was clinically sarcoma. The eye was excised. The patient was still well, eleven years afterward.

MR. BASIL GRAVES thought the growth was very superficial and cellular, and that it was a nevoid growth.

Aniridia and dislocated lens

MR. HUGH THOMPSON showed a patient whose father appeared to have been affected in the same way. Each lens was dislocated upwards; no iris could be seen.

Retinal arterial obstruction

DR. G. W. KENDALL exhibited a female patient who had loss of the upper half of the visual field of one eye, but visual acuity was 6/6 in each eye. There appeared to be obstruction of the inferior retinal arteries.

Partial evulsion of optic nerve

MR. A. D. GRIFFITH showed a boy aged eighteen years, whose left eye presented a mass of scar tissue around the optic disc. The picture was that of partial evulsion on the optic nerve, and it might have been due, he thought, to a birth injury.

Discussion. MR. BASIL GRAVES spoke of seeing a similar condition resulting from a blow with a pitchfork. In the present case there was probably some trauma.

Senile exudative retinitis

MR. HUGH THOMPSON exhibited a patient with acquired central choroiditis simulating a second optic disc. A year ago, when he first saw the patient, the right eye had been in much the same condition as now, i.e., with a central patch simulating the optic disc. There was only peripheral vision. Last November the patient came again and stated that his left eye was going wrong. His vision was slowly deteriorating, and last time it was examined it was only 6/18. There was a distinct patch in the macular region, probably, Mr. Thompson thought, an early stage of the same condition as in the right eye. It was probably a macular degeneration. The man was a heavy smoker. Three of his teeth had been extracted.

Discussion. MR. H. NEAME'S view was that it looked like a central senile exudative retinitis.

MR. DAVENPORT felt no doubt that this came into the class of senile exudative retinitis, and he thought the patient showed cardiovascular, or at least vascular, degeneration.

Microphthalmos due to intrauterine inflammation

MR. JUDSON showed a case that seemed to be a definite example of ulceration of both corneæ before birth.

LOS ANGELES COUNTY MEDICAL SOCIETY

Eye and Ear Section

March, 1928

DR. BERTRAM DAVIES, *president*

(The March meeting was held at the Los Angeles General Hospital, where the patients from the eye service were demonstrated by the staff.)

Cataract operation in syphilitics

DR. GEORGE MCCOY showed two patients upon whom cataract had been done. They both had had positive Wassermann reactions before operation,

and only one became negative under treatment. Specific treatment was used before and after operation. There were no complications.

Divergent squint

DR. THEODORE LYSTER showed a patient upon whom he had operated for divergent squint. The eyes were hyperopic and there was a divergence excess, the right eye diverging in distant fixation. Three tenotomies were done upon the externi and one advancement of the right internus was done. After these procedures the eyes appeared straight both in near and distant fixation.

Anterior staphyloma of the sclera

DR. S. HASTINGS had a patient who had fallen and struck the right eye two weeks ago. Following this a small staphyloma of the sclera developed two mm. to the nasal side of the left cornea. The fundus showed no pathology. The tension was normal.

Trephine operation following iridectomy

DR. CLIFFORD WALKER showed a patient upon whom he had done Elliot's operation subsequent to an iridectomy. He placed the trephine to one side of the coloboma to avoid injuring the lens through the coloboma.

Iritis with synechia

DR. HARRY MILLER showed a man thirty-four years old who had had ten attacks of iritis with resulting posterior synechiæ. Atropin had no effect and the vision was 20/100. He used a subconjunctival injection of cocain and adrenalin which dilated the pupil and broke the adhesions, and the vision improved to 20/20.

Action currents in nystagmus

DR. LEON MYERS, by invitation, presented the results of experimental work on action currents produced in the extraocular muscles. The string galvanometer used in the electrocardiograph was employed to record the results. Electrodes were applied to each temple for records of lateral movements and to the forehead and cheek for vertical movements. Upon voluntary movements of the eyes a marked deflection of the string occurred, and this line of deflection was wavy, showing that several impulses were necessary to complete the movement. Upon producing nystagmus, there was a slow movement of the string in one direction, followed by a quick return in the other, corresponding to the movements of the eye. In a horizontal nystagmus produced in an individual with a paralyzed external rectus muscle on one side, the deviation of the string in the direction of the paralyzed muscle was impaired; but in an individual with a third nerve paralysis the deviation was about the same in both directions. This indicated that the external recti were responsible for the action currents. In an albino the curve was of an oscillatory nature and not typical of nystagmus.

M. F. WEYMANN,
Clerk.

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

January 13, 1928

DR. FRED J. PRATT, president

Keratitis profunda and iridocyclitis

DR. A. E. SMITH reported this case because of certain unusual features. The case had been under treatment elsewhere for two months; local treatment only having been used. The Wassermann reaction was negative. Repeated after provocative doses of salvarsan, it was still negative. The tuberculin reaction was strongly positive. There had been conventional local treatment with foreign protein therapy. Decided improvement followed removal of chronically diseased tonsils and this improvement has continued until the inflammation had entirely subsided. The vision was reduced to counting figures at one half meter.

Discussion. DR. J. A. WATSON inquired whether Dr. Smith meant that the reaction was general or local

when he said that the patient had a marked tuberculin reaction.

DR. SMITH stated that it had been both general and local.

DR. CARL LARSEN said that, in view of the fact that the patient had had a marked reaction after tuberculin, he would suggest that she have very guarded doses of this remedy. He was aware that many men had been disappointed in tuberculin, but in this particular case it seemed to him well worth trying.

Retinal detachment

DR. SMITH also reported a case of retinal detachment which was of interest because in the first place it had the appearance of being due to a neoplasm. Dr. Walter Camp had also seen the case at that time. Enucleation was advised, but refused by the patient. The appearance of the fundus had changed markedly now, and it was likely, from the subsequent course of the case, that the detachment was due to an exudate.

WALTER E. CAMP,
Recorder.

COLORADO OPHTHALMOLOGICAL SOCIETY

January 21, 1928

DR. WILLIAM A. SEDWICK presiding

Cicatricial ectropion corrected by plastic operation

DR. DONALD H. O'ROURKE exhibited Mrs. D. B., aged thirty-five years. Ectropion followed a burn of the lower eyelid and adjacent tissues. The condition had existed for thirty-four years and had been operated on three times in the past by general surgeons. Following each operation more contraction and disfigurement occurred.

The patient was operated on by Dr. John M. Wheeler, of New York, during the summer postgraduate course at Denver, in July, 1927. He removed all scar tissue from the base of the ectropion; the upper and lower lid margins were united by three separate bridges and then an epidermal graft taken from the thigh was placed on the denuded areas. The case was shown because of the perfect result obtained, and to illustrate the efficacy of the uniting of the two lids in order to hold the lower lid in place during the period of establishment of the graft. Photographs taken before the operation were exhibited.

Congenital coloboma of iris, crystalline lens, and choroid.

DR. WILLIAM C. FINNOFF showed Mr. P. E., aged fifty-nine years. The vision of the right eye had always been better than that of the left. The vision of both eyes had begun to fail ten years ago and had continued to do so gradually until the present time. The vision of the right eye was 0.01, of the left light perception and good projection.

Right eye: congenital coloboma, directed down and slightly laterally; posterior synechiæ in region of true pupil; notch in lens below in region of coloboma of iris; incipient cataract. Fundus details visible only below coloboma of lens. Visible fundus showed coloboma of the choroid below.

Left eye: small piece of steel embedded in cornea, in the lower nasal quadrant, near limbus, showing siderosis of adjacent cornea; another foreign body embedded in bulbar conjunctiva near outer canthus. Congenital coloboma of iris, slightly larger than right, directed downward and laterally; coloboma of lens; incipient cataract, more advanced than in right eye. Coloboma of choroid was seen below. With the corneal microcope, the zonular fibers were found to be absent in the region of the coloboma. On the lower mesial border of the coloboma of the left lens, a mossy mass of pigmented tissue was adherent to the lens capsule.

Discussion. DR. MELVILLE BLACK thought the case a difficult one to approach from the standpoint of operation. He was not familiar with any statistics which supported any particular method of operation in these cases. He believed that a preliminary iridectomy was in order and that the section should be made from above.

Dr. Edward Jackson stated that the lateral posterior synechiæ which existed were broad and probably very firm and that this complication offered a very serious obstacle especially in the expression of the lens. He advised doing the iridectomy temporalward because in this position one broad posterior synechiæ and the anterior lens capsule could be removed together. Although the location of the coloboma temporalward was not the best position for an optical iridectomy, still it seemed worth consideration in this particular case.

Dr. E. R. Neeper had done a cataract extraction on two such eyes and he believed from his observations that these eyes did not tolerate surgical interference.

Dr. Finnoff closing said that it was his idea to operate on the left eye first because in this eye there were no synechiæ. He contemplated making the incision at the lower limbus with a large conjunctival flap.

Alternating convergent squint

Dr. William C. Finnoff also showed A. F., male aged twelve years. When first seen on April 5, 1927, an alternating convergent squint of 30° was found. The vision of the right eye was 20/20, and of the left 20/15.

On March 19, 1927, a tenotomy of the right internal rectus and an advancement of the external rectus of the same eye were done. Since the operation fusion exercises had been given with excellent results. The eyes were parallel for distance and showed a slight tendency to convergence for near. For distance by the Maddox rod before one eye, two images were distinctly seen and only two centrads of esophoria were present; for near ten centrads of esophoria. There was a right hyperphoria of one centrad.

The fusion faculty was now well developed, and with Hering drop test he was able to state accurately the position of the small objects dropped with reference to the wire.

Discussion. Dr. Frank Spencer recalled that Worth had advised that if the angle of squint was twenty-five degrees or more tenotomy and advancement were indicated; if less than twenty-five degrees an advancement was sufficient; also that he estimated his surgical procedure much as a violinist does in placing his finger on the string.

Dr. Melville Black stated that in alternating squint usually there was no fusion center but that this case apparently was an exception, as some fusion sense had been developed.

Dr. Finnoff in closing said that he had shown the case to emphasize that we should strive in these cases to obtain not only a cosmetic but also a functional result.

Trachoma

Dr. James M. Shields exhibited Mr. J. L., aged seventy-one years. His history revealed that his eyes had given no discomfort until about two years ago, when he felt some soreness of both eyes.

He was first seen five weeks ago. The lids were so swollen that the patient could not open them. They were brawny and fissured, with some crusting of the margins. Both corneas presented large central ulcers; that on the right measured about six mm. in diameter; that of the left about four mm. An extremely dense pannus covered both corneas from the entire periphery into the central ulcers. The everted upper lids presented the typical picture of old trachoma, with marked trachoma granules and a good deal of scarring.

The treatment had consisted of daily applications of two per cent silver nitrate followed by one per cent yellow oxide ointment. The ulcers were now completely healed. A peritomy had been done on both eyes, and the tarsus had been resected from both upper lids. The pannus had shown remarkable improvement but was still too dense to permit more than seeing moving objects at about four feet.

Discussion. Dr. David Coover believed that the peritomy had helped this patient. He suggested that the larger vessels on the corneal surface

be split longitudinally with the idea of causing their disappearance so that more clear cornea would result.

Choroidal lesions

DR. JAMES M. SHIELDS showed Mrs. W. S. P., aged forty years. Surrounding the macular region of the right eye were numberless whitish patches which seemed to be in the choroid. No reduction in vision had occurred. The areas were small, discrete at some points, confluent at others. There was no pigmentation. The tonsils had been removed, and two abscessed teeth extracted.

The fundus condition had not been present when this patient had been examined five years previously. A diagnosis had not been established.

Discussion. DR. EDWARD JACKSON thought that the changes were degenerative in character, because he saw no evidence of inflammatory changes. He located the lesions in the superficial choroid and in the pigmented epithelium of the retina.

DRS. FRANK SPENCER and WILLIAM C. BANE raised the question as to drüsen being the proper diagnosis.

Piece of steel in iris

DR. EDWARD R. NEEPER brought Mr. D., aged twenty-six years, whom he had examined first on December 17, 1927. Four days previously a metal fragment from an ax and hatchet contact struck the left eye. A physician had incised the cornea below and had applied a small magnet to the metal, which was enmeshed in the periphery of the iris at about axis 240 degrees. He was unable to dislodge it, although there was a distinct pull. The incision was firmly healed when the patient was examined on December 17. The bulbar conjunctiva was moderately injected, the pupil slightly dilated, pear-shaped with the stem pointing toward the foreign body. The inflammation gradually had quieted down and the eye had become almost entirely free from irritation until ten days ago, when the patient acquired a nasal cold and a bilateral epidemic conjunctivitis.

When last seen on January 19, 1928, the left eye showed no evidences of inflammation. All sensitiveness had disappeared. Vision was 20/30. The iris had gradually become slightly browner around the metal, which x-ray showed to be 0.04 mm. horizontally by two mm. vertically. All media were macroscopically clear. The case was exhibited in order that the proper surgical procedure might be suggested and adopted.

Discussion. DR. MELVILLE BLACK advised removal of the particle of steel as soon as the eye became quiet. He would use a keratome incision over the site of the foreign body, then with the aid of a magnet pull the foreign body out through the wound together with the iris. If necessary an iridectomy might be done including the foreign body.

DR. GEORGE F. LIBBY thought that a wide keratome incision at the site of the foreign body and the insertion of an iris forceps which had been previously magnetized would aid in grasping the particle of steel. If some iris tissue prolapsed during the manipulation it would be good surgery to excise the presenting portion of the iris.

Secondary glaucoma

DR. FRANK R. SPENCER showed Mr. W. F., aged twenty-six years, a coal miner who was struck in O.D., August 29, 1927, with a piece of steel, which made an incision of the cornea from approximately 6:30 o'clock obliquely up and in, with spontaneous evacuation of the aqueous. Under the influence of atropin and a pressure bandage, the wound closed, but it broke open again later; closing a second time with an adhesion of the iris to the corneal incision. Vision was O.D. 6/30, O.S. 6/10 + 3. X-ray examination failed to show a particle of steel or iron in the eye or about the eyeball. After the wound closed the second time, he developed secondary glaucoma as a result of the anterior synechia. Tension with a Gradle-Schiötz tonometer was forty-seven millimeters of mercury with a one-gram weight. Under eserin this was reduced considerably, and he was much more comfortable. When

he returned several days later the tension with the tonometer was fifty-eight millimeters. The fundi were negative.

A large conjunctival flap was made below, and with a keratome the cornea was incised at the lower end of the linear cicatrix. A broad iridectomy was done and the attachment of the iris to the corneal wound freed. The tension on January 19 was eighteen millimeters of mercury by the tonometer. The patient had been quite free from pain. The vision had not improved.

The broad conjunctival flap had served several purposes. First, it helped to avoid infection. Second, by constant pressure on the cornea it flattened the lips of the wound. Third, adhering to the lower end of the incision it had undoubtedly strengthened the cicatrix.

The field of vision was very contracted for O.D., partly due to the irregularity of the cornea, and also to the secondary glaucoma. The left field was normal.

DONALD H. O'ROURKE,
Secretary.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

April 16, 1928

DR. J. LESLIE BRYAN, chairman

Arteriovenous fistula and cavernous sinus thrombosis

DR. GUY M. MANESS presented E. F., a colored male of eighteen years, who had been struck by an automobile approximately twenty-two months previously. He was unconscious for several days following the accident. Upon regaining consciousness it was found that he had a complete sixth and seventh nerve paralysis on the right side. He also had a partial middle ear deafness on this side. Since the accident there had been a continuous buzzing sensation in the right side of the head and progressive exophthalmos of the right eye. An x-ray picture taken three months after the injury showed a fracture of the right side of the skull just above and posterior to the external auditory canal.

During the course of a year the sixth and seventh nerve paralysis had largely cleared up. However, the unilateral exophthalmos was much more marked, and a definite pulsation of the eye synchronous with the radial pulse could be felt. Vision O.D. was 20/70; O.S. 20/20. Both visual fields were normal. The conjunctival and episcleral vessels of the right eye were enlarged. There was slight ptosis of the upper lid, which was apparently mechanical. The exophthalmos was so marked that the function of the external ocular muscles could not be accurately determined. The pupillary action was normal. There was marked engorgement of the retinal veins, but the arteries were of normal appearance. The disc showed a very faint haziness of its margins, but was otherwise normal in appearance. No hemorrhage or exudate was seen. There was a distinct thrill felt, and a loud bruit heard over the right frontal area. These were synchronous with radial pulse. Examination of the left eye was negative.

A diagnosis of arteriovenous fistula between the internal carotid artery and the cavernous sinus was made. The patient was admitted to the hospital for ligation of the common carotid artery and the jugular vein. The general physical examination was essentially negative. The laboratory work, including blood, urine, renal function, blood and spinal Wassermanns, was negative.

A collar was devised by which compression of the carotid artery could be obtained. Compression was begun at first for five minutes, five or six times daily, and gradually increased during the course of a month until it was being used an hour or two several times a day. At first, compression of the artery caused the thrill and bruit to disappear, but after about a week it failed to do so. The idea of pressure on the carotid artery was to develop a collateral circulation before ligation was done.

Ligation of the common carotid artery and of the jugular vein was then

done under local anesthesia by Dr. I. A. Bigger. As soon as the common carotid artery was ligated the patient voluntarily stated that the buzzing sensation in the right side of the head had ceased. There were no untoward effects following the operation. The patient was relieved subjectively of the buzzing sensation in the right ear. The thrill and bruit were greatly reduced in intensity. There was still some pulsation of the eye. Compression of the left common carotid artery at this time caused complete absence of the thrill, bruit, and pulsation.

Three days after ligation of the carotid artery and jugular vein, the superior ophthalmic vein was ligated, in the hope that it would thrombose back to the inferior ophthalmic vein and thus relieve the pulsation of the eye. Twelve hours after the operation the patient showed no untoward symptoms. He then developed signs of increased intracranial pressure with severe headache, projectile vomiting, and an irregular pulse. The thrill, bruit, and pulsation of the eye had all disappeared. His right eye began to swell, and at the end of twenty-four hours there was a marked edema of the conjunctiva, lids, and surrounding tissues, the conjunctiva of the lower lids being so edematous that it was everted between the lid margins. The retinal veins showed little change. The whole retina was edematous, but no choking of the disc occurred. The temperature remained practically normal throughout the course. The spinal fluid pressure was increased. The whole picture pointed to an aseptic cavernous sinus thrombosis.

Under frequent administration of magnesium sulphate per rectum, fifty per cent intravenous glucose, and frequent spinal drainage, the symptoms of increased intracranial pressure gradually diminished until within two weeks they were practically absent. But the edema of the conjunctiva and surrounding tissues increased. A definite iridocyclitis, followed by panophthalmitis, occurred, leading to enucleation of the eye twenty-five days after the previous operation. The patient was discharged from the hospital ten days later. There had been no return of the buzzing sensation in the right ear. The thrill and bruit were still absent, and there were no longer any signs of increased intracranial pressure. The left eye had never shown any involvement. The conjunctival tissue had receded to practically normal. The patient, who was now apparently in perfect health, was shown for two reasons. First, he evidently had had a cavernous sinus thrombosis with recovery, and, second, his arteriovenous fistula had apparently been completely cured, although an eye was sacrificed in doing so.

Discussion. Dr. Robert Warner said that he had seen four cases like this. The first was at Bellevue Hospital, under Dr. May, who had told him always to listen for the bruit. This patient tonight was the third case he had seen. The fourth case was that of a boy who received a shotgun wound in the face, four or five shots in the eye and several around the scalp. The eye was totally destroyed. After enucleating the eye there had been hemorrhage so marked that the lids could not be closed. He put on a pressure bandage. The second day afterward the conjunctiva was sticking out between the lids and he had to use adhesive strips to close the lids. The patient made an uneventful recovery, until about six months later, though he still had marked bulging of the conjunctiva, he could still close his lids. There was a marked bruit. All these cases were of traumatic origin.

Dr. F. E. Hasty said that the three cases he had seen were traumatic in origin. Two patients seen within a few days of each other were relieved by operation, the third patient died unrelieved several days after the operation.

Dr. Fred Hasty objected to ligating the jugular vein, and suggested that this might have been an accident.

Dr. Maness said that it had not been done accidentally.

Herschel Ezell,
Secretary.

American Journal of Ophthalmology

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

Address **original papers,** other scientific communications including correspondence, also **books for review** and **exchange copies of medical journals** to the **Editor, 530 Metropolitan Building, Denver.**

Reports of **society proceedings** should be sent to **Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis.**

Subscriptions, applications for single copies, and communications with reference to **advertising** should be addressed to the **manager of subscriptions and advertising, Jean Matteson, Room 1209, 7 West Madison Street, Chicago.** Copy of advertisements must be sent to the manager by the fifteenth of the month preceding its appearance.

Authors' proofs should be corrected and returned within forty-eight hours **to the editor.** Twenty-five **reprints** of each article will be supplied to the author without charge. Additional reprints may be obtained from the printer, the George Banta Publishing Company, 450-458 Ahnaip Street, Menasha, Wisconsin, if ordered at the time proofs are returned. But **reprints to contain colored plates must be ordered when the article is accepted.**

OPHTHALMIC CASE REPORTS

The making of case records gives excellent practice in selecting and portraying the important and interesting features of the cases one encounters. It may give the best of training for writing medical papers. It fosters habits of close observation, the arrangement of things observed, and practical completeness in case studies. The best material available for most practitioners who wish to have a creditable entrance into medical literature is afforded by skillful records of cases that have been watched throughout their course and have been subjected to the test of follow-up inquiries and to comparison with related cases that may be found in the literature.

One should make his case records, not with the idea that later he will have them simply copied and sent to a medical journal, nor with the expectation that they will all be worth publishing, but with the idea of having accurate and complete accounts of the cases, that may be used when he has something of real importance to bring to the attention of professional colleagues. When several cases of the same kind have thus been gathered and studied together, it is very likely that they can be grouped and presented in a way that will make them helpful to readers and a credit to the author.

There are some details that may be recorded in every ophthalmic case. The patient's age, sex, vision, general health, and previous occupation imply so much that it is well to note them in every case record. It is not worth while to have a stereotyped form calling for these and other details, always to be given whether they have significance in the particular case or not. The filling out of printed blanks to furnish official reports in approved form has often spoiled rather than aided one who was ambitious to write really interesting and valuable reports of medical cases.

Especially bad is the habit of filling the inappropriate spaces in a blank with negatives. Such negative statements may raise the suspicion that the writer is trying to make a show of

thoroughness, while concealing the omission of observations that would really be valuable and are properly to be expected in the account of such a case. At least the reader is likely to discover that the negatives are worthless, and hence to infer that nothing of much importance will be found in a paper in which worthless statements are allowed to occupy so much space. Or it may be suspected that the blanks have been filled in afterward, and that no careful observation regarding a particular point was made at the time of examination. That kind of padding in a case report is inexcusable, and should be excluded from any statement of scientific facts. Rigid adherence to the truth is the most important character for all scientific records or papers.

While brevity and exclusion of irrelevant statements should be aimed at in case reports, the reader can justly demand that all essential facts and details shall be included. In a case of apparent eyestrain the patient's near point, muscle balance, habits of eye work, conditions of illumination, and freedom from nasal or sinus disease or toxic conditions may be just as important as the fact that he has headache, or that the eyes feel badly after reading or were crossed at times in childhood. That exophthalmos was present may be no more important or enlightening than the suddenness or the slow increase of its first development, or the presence of tumors in other parts of the body, or the evidences of endocrine or nervous disturbance.

When the case has run its course it may be seen that the detection or exclusion of some slight symptom at the first examination would have thrown a flood of light on the character and prognosis of the case. The noting of everything important from the beginning of the case gives the record the greatest value to the practitioner who keeps it; and the inclusion of all pertinent information available makes the case report of most value to the reader. One who is devoid of any ambition to become a medical writer or teacher may yet wisely spend much time and energy in keeping and perfecting case records for his own study and guidance, and for intensive training in observation. One who masters this kind of case study can hardly fail in the end to make additions of real value to ophthalmic literature. Instances of such contributions appear in every issue of this Journal. *E. J.*

METAPLASIA OF THE EYE

The term metaplasia is now generally applied to what Virchow called "histological substitution". It occurs when one specialized tissue is produced from cells that normally produce another tissue. The significance and importance of such departures from the usual course of development in the eye have been brought out by Treacher Collins, in a grouping and review of the instances occurring in ocular tissues (Transactions Ophthalmological Society of the United Kingdom, 1927, volume 47, page 124). He divides the metaplasias into four groups: embryologic, pathologic, neoplastic, and biologic.

The first group includes some of the experimental and clinical anomalies. Removal of the lens from the larval newt or salamander is followed by the production of another lens, from cells that normally produce epithelium on the back of the iris. In the frog, epiderm from another part will form a lens when placed in contact with the optic vesicle; and the ectoderm of the part that should normally develop the lens will not do so when removed from contact with the optic vesicle. Skin is substituted for conjunctiva when the latter is permanently exposed to the air, as by coloboma of the lids. Bone may develop in the connective tissue of the conjunctiva, or cartilage in that of the sclera. Retinal elements and pigment epithelium may develop in the optic nerve, or out of their normal relations in the eyeball.

Metaplasias classed as pathologic develop as results of inflammation.

Thus bone is substituted for connective tissue, in ossification of the choroid, and may develop even in noninflammatory exudates. In this process the connective tissue corpuscles become converted into true bone corpuscles. The cells that produce such a metaplasia might be endothelial cells, derived from the blood vessels. An incision or other break in Descemet's membrane, is repaired by neighboring endothelial cells lining the new membrane. These proliferate, and some of them develop into laminated fibrous tissue that may closely resemble the cornea. In a similar way, after any perforation of the capsule, the epithelial cells which line the anterior capsule of the lens proliferate; or perhaps the same development may occur under the influence of toxins reaching them through the capsule, or from continued traction on the capsule; and thus give rise to the opaque tissue of anterior polar or secondary cataract. The cells liable to cause such undesirable metaplasias may be got rid of by extracting the lens in its capsule, or by extracting the central part of the anterior capsule with capsule forceps. These undesirable effects may also be avoided by keeping the opening in the capsule away from the center of the pupil, so that if opacity follow it may not interfere with vision. It is interesting to know that the cells lining Descemet's membrane, supposed to be derived from the mesoblast, and those lining the lens capsule, clearly of epiblastic origin, both share the embryonic capability of producing metablastic reparative or cicatrical structures.

The term neoplastic metaplasia is restricted to new growths when the cells or tissue produced are derived from that of the part in which the growth originated. Here metaplasia must be distinguished from teleplasia, or reversion to a primitive type—a form of cell atavism. It is very difficult to determine the facts and to disentangle the essential relations of metaplasia and teleplasia in regard to the origin and true character of some of the most important and generally recognized malignant tumors. This is illustrated by the confusion that still exists with regard to the origin and classification of growths called glioma, sarcoma, and melanotic tumors, to some of which Collins simply calls attention in this regard. The substitution of stratified horny epithelium, like that of the skin, for the secreting epithelium of the conjunctiva, is an instance of such metaplasia. So, too, are the appearance of yellow elastic tissue for white fibrous tissue in the conjunctiva, giving the characteristics of pinguecula, and of loose vascular areolar tissue over the surface of the cornea in pterygium. The formation of fibrous tissue with spindle-shaped cells from endothelial cells may almost be called the physiologic formation of connective tissue.

What may be called biologic metaplasias are such as result from a change of environment in the early life of the individual, and some of these may become characteristic of the species, if they have definite functional utility. The cartilage in the sclera of the fish, the stratified fibers in the ciliary muscle and iris of some animals, and the tapetum lucidum in animals that have to see by a dim light are instances of permanent utilization of such metaplasias. The paper of Treacher Collins illustrates the broad relations of simple facts, the wide opportunity for utilization of knowledge that may come incidentally in scientific observations directed primarily to other objects. *E. J.*

OPOTHERAPY OF VERNAL CATARRH

The seasonal character of vernal conjunctivitis suggests an analogy between this disorder and hay fever. In the latter the patient develops an anaphylaxis to one or more of the pollens which float in the atmosphere. Vernal catarrh is usually a disease of childhood which disappears when the age of puberty is past, but it has been

known to occur after removal of the ovaries.

In 1294, Henri Lagrange published two clinical observations in which a condition of anaphylaxis had apparently given rise to special forms of conjunctivitis, the anaphylaxis in turn being traceable to a disorder of endocrine function. One of these cases was in a woman of forty years, after castration, and the conjunctival disturbance cleared up under ovarian extract.

Dysfunction of the endocrine glands is not uncommon in childhood, and Lagrange now publishes (Annales d' Oculistique, vol. 165, p. 349) four cases in which such dysfunction was apparently connected with attacks of vernal catarrh.

In each patient there was a definite retardation of testicular development. In the first case this was associated with enlargement of the thyroid, and there was a syphilitic history in the family, although the blood Wassermann test of the twelve-year-old boy-patient was negative. A number of positive skin reactions to pollen were obtained. Attempts at opotherapy had a disturbing effect on the goiter, so that this line of treatment could not be followed up, but after five years the establishment of normal testicular development closely coincided with cessation of the seasonal liability to conjunctivitis.

In the other three cases testicular extract was systematically administered each season upon recurrence of the spring catarrh; and in each case administration of the extract was followed by marked improvement in the conjunctival condition. In one case the improvement each year under opotherapy was strikingly rapid. It is interesting to know that all four patients also had marked anaphylactic reactions to pollen or other substances.

W. H. C.

PREEMPLOYMENT VISUAL ACUITY TESTS

The practice of industrial ophthalmology leaves very much to be desired. In spite of well meant efforts to instruct the undergraduate medical student in certain essential details, the average industrial physician develops little facility in giving the right kind of first aid after ocular injuries, and too often fails to forward the case to the ophthalmic physician with sufficient dispatch to avoid serious complications, often from minor injuries which should not have interfered seriously with the future of the eye.

In addition to this ground for complaint, it is to be regretted that the determination of compensable visual loss is too often rendered extremely difficult by the impossibility of discovering what was the visual acuity of the injured eye at the time of commencing employment.

The following is a case in point: A man claimed compensation for loss of vision of one eye after an apparently trifling injury in a Colorado coal mine. He had striking facial scars which he admitted were due to a crushing injury sustained in Wyoming several years previously, and upon inquiry he confessed that the same eye had been to some extent involved in the earlier history, although he denied that the sight had been lost at that time. The principal pathological changes in the injured eye were such as would be very likely connected with the earlier injury, and most unlikely to have resulted from the injury which was made the basis of the claim for compensation. It proved practically impossible to obtain satisfactory collateral information as to the Wyoming injury and its consequences, and it was evident that no adequate record of visual acuity had been made at the time of employment by the Colorado mining company. The claim was denied as the result of expert opinion, but the legal position would have been much more definite if a preemployment visual test in Colorado had been a matter of record.

McAuliff's statistical discussion of noncompensable visual defects in industrial ophthalmology (see page 714) calls attention to the large number of

workers who enter upon employment suffering from visual defects of important degree, due sometimes to refractive errors or congenital amblyopia, sometimes to previous injury, sometimes to disease of superficial or deep ocular structures. Compulsory examination prior to employment, done with proper skill and duly recorded, would diminish the risk involved both to the workman himself and to his fellow employees, would tend to greater industrial efficiency by avoiding the interruptions due to accidents, would diminish the cost of insurance, and would lessen the frequency of unjust claims.

In small industrial centers, eye examinations must often be entrusted to the camp physician; and it seems highly desirable that medical schools should devote more particular attention to preparing their students to carry out the relatively simple diagnostic procedures which are necessary for this purpose. In larger centers, as McAuliff points out, visual surveys should be made by the medical expert and not by the optometrist.

W. H. C.

THE MEDICAL RESERVE OFFICERS TRAINING CAMP

The maintenance of a reserve corps is a part of the military policy of the United States, and of this corps the medical Reserve is an important unit. In a tremendous organization such as our army in the late war, there must obviously be very complicated machinery for the conduct of every department, and it is vitally necessary that the officers in each department shall have a reasonable understanding of this machinery so that they may help it to function smoothly. They should also have an insight into the interrelation of the various branches of the service, for the efficiency of the army depends on exact correlation of its parts.

It is for these reasons—emphasized by the failures of the past war—that the Medical Department is now stressing the necessity for the medical officers to learn the administrative details of the organization.

In the higher grades, especially, the duties of medical officers, in case of another war, will be largely administrative.

With this in mind a system of credits for work along this line has been devised. A certain number of these credits must be obtained in a given number of years, or the officer is transferred to the inactive list. He can remain only a limited period on this list before being dropped from the corps. Additional credits, associated with stipulated periods of time spent in each grade, are required for advancement into the succeeding grades. By this method, those who are not conversant with the military administration of the corps will ultimately be eliminated. One of the methods of teaching administrative procedures is the training camp. These camps have been held for a period of two weeks each summer for several years.

Many things may be said in favor of these camps aside from their value for instruction. The physician spends two weeks in a healthy outdoor life, combining exercise and study among a congenial group of men all interested in the same subject. The fact that the officer is paid for this training at the regular rate of pay for his grade is of some importance in considering the mode of spending a vacation period.

The camp for medical officers at Fort Snelling, Minnesota, opened on July third, the previous day being allowed as a day of travel to the camp. Beyond the fort, with its old but not unattractive barracks much in need of paint, green painted wooden huts of war-time construction waited us. Courteous officers and men greeted us at headquarters, where we were rapidly inducted into active duty. Assignment of quarters in a barrack with some thirty other officers followed. Bedding was provided by the quartermaster and was brought to the sleeping hut by the orderly.

Before any activities are undertaken "processing" must be gone through. (For the benefit of the uninitiated, this is the term for physical examination.) The long queue of seminude men being slowly put through this routine was entirely too reminiscent of war days, and was one of the few disagreeable features of the camp. Surely some method of previous certification as to physical condition will soon have to be substituted for this unnecessary feature.

From the next morning, every day except the Sunday and Fourth of July holidays we were roused by some cheery soul at five forty-five a. m. preliminary to "setting-up" exercises at six. At six-twenty breakfast was served in several large mess halls. Food was good, equipment clean, and service prompt. One hour later there was a lecture. The system of teaching followed this year was that of self instruction. The student body was divided into units, and the subjects to be considered were assigned to different members of each organization in advance. Each lecturer prepared his subject and presented it to his group.

At eight-thirty there was an hour of drill ably conducted by infantry officers chosen because of their skill as instructors. All officers called the commands in unison as if each were giving them to a company. This gave a familiarity with commanding which no other method would afford in so short a time. More classes followed the drill until dinner at noon, and shortly after dinner classes were resumed for two and a half hours, following which there was no further duty until the next morning. As far as possible demonstrations were used instead of lectures. Before dark there was ample time for "eighteen holes" on one of the beautiful golf courses in and near the Twin Cities, and two or three nights a week camp entertainment was provided in the form of singing, wrestling and boxing bouts, or "movies".

A splendid demonstration of a medical regiment in action was put on by the young men of the Reserve Officers' Training Camp. Units were set up at each point, equipment was laid out and some students served as subjects and others as lecturers. This phase of teaching should be carried further, and every lecture in which there is a possibility of concrete illustration should be so handled. The things which we actually see and do are much more readily understood than those of which we only read or hear. One particular subject for study this year was the general hospital, and each officer was required actually to plan a hospital on the grounds of the camp, filling in all the necessary details.

One of the problems of future organization is to make the instruction progressive, in other words to conduct a graded school. The present plan does not allow for this, and for officers attending year after year as many do there is wasteful repetition. This could be largely avoided by using the method of self-instruction and offering from six to eight different two-weeks programs, to be given simultaneously by different groups.. In this manner each officer could choose the group with which he desired to work, and could take up a new subject each year until he had covered the entire field.

There are many camps in different sections of the United States. The one described is that of the seventh corps area. It is voted by all who have attended it to be beneficial in every way and the credit for this success should largely go to Colonel Skinner, the corps area surgeon, and Major Hart, his executive officer, who have done everything possible to make the period of training interesting and profitable. They are typical examples of the medical officer of the modern regular army, courteous, efficient, realizing the importance of the reserve officer in the general plan and endeavoring in every way to cooperate with him. *L. T. P.*

BOOK NOTICES

The development of the human eye. Ida C. Mann, M.B.,B.S., F. R. C. S. (Eng.), Assistant Surgeon Royal London Ophthalmic Hospital, etc. Cloth, octavo, 316 pages, two plates in color, 241 illustrations. Cambridge, The University Press, 1928.

This book, printed for the British Journal of Ophthalmology, and with a "foreword" by Sir John Parsons, is well sponsored. With the reputation its author has achieved by her important original papers on various phases of this subject, it will arouse immediate interest among English reading ophthalmologists throughout the world. As the foreword states, "hitherto there has been no comprehensive monograph in English devoted to the embryology of the human eye".

The author's preface thanks the directors of the British Journal of Ophthalmology for undertaking the publication of this book, Sir John Parsons "for his unfailing encouragement", Mr. Leslie Paton "for his invaluable advice", and Prof. J. Ernest Frazer of the University of London for teaching her "the technical intricacies of embryological research" and for the material which made the work possible.

The first two chapters, on the early stages of the formation of the primary optic vesicle, and a general outline of the development of the optic vesicle and the associated mesoderm, will be of especial value to readers who have not given special study to embryology. This will include not only most ophthalmologists, but most students of comparative and human embryology. Some of the other chapter headings, although appropriate and well chosen, will not at first reveal to the reader of books on ophthalmology all that they contain.

Of chapter 3, "the Lens" is a title clear and familiar, but may not indicate what it contains about abnormalities of the lens, and the changes in the relations of the anteroposterior and equatorial diameters that occur with growth of the secondary lens fibers. In 4, on the neural ectoderm, one would expect to read of the retina and perhaps of the optic nerve and the chiasmal region. But he might not look for the development of the macula and fovea, or the pars ciliaris retinæ, or the sphincter and dilator of the pupil. Chapter 5 includes, with the vitreous and suspensory ligament of the lens, Cloquet's canal and abnormalities. Chapter 6, on the associated mesoderm, emphasizes the dominance of the ectoderm in the development of the eyeball. It deals with the development of blood vessels in the orbit and eyeball, including the hyaloid artery and its branches. It also considers the development of the choroid, ciliary muscle, cornea, and sclera.

Chapter 7, on the orbit and its contents, takes up the extrinsic ocular muscles, the head cavities, the capsule of Tenon, the lids and the lacrimal apparatus, and the position of the eyes. Not only are the eyes enclosed by the development of these adjoining parts, but their direction is changed. Starting with the optic axes diverging at an angle of 160° in the nine mm. embryo, this angle grows less, to 120° in the sixteen mm. stage and to 72° at forty mm., and so down to parallelism. Chapter 8 deals with the primitive vertebrate eye, its modifications in mammals and in the line of development leading up to birds. In chapter 9, in three parallel columns, is given a synoptic comparison of ocular with general development. The first column gives the length of the embryo or the age of the fetus, the second the condition of the eye, and the third the condition of other important organs or the general body form.

The value of this work as a book of reference is confirmed by its bibliography of fourteen pages and its alphabetic index. The illustrations are largely reproductions of sections and drawings by the author. They add

greatly to the educational value of the book.

An account of the embryologic development of an individual is a history of the development of the species. That history gives hints for the solution of problems yet unsolved, explanations of things otherwise puzzling, in the phenomona of health and disease. It binds together and discloses the significance of facts otherwise useless and hard to remember or appraise. No ophthalmologist can afford to remain uninformed about the embryology of the human eye. Now that we have in our language such a good book on the subject, that book should become familiar and accessible to every one interested in ophthalmic literature. *E. J.*

Le micosi oculare (The ocular mycoses). V. Cavara. 494 pages. Siena, 1928.

This monograph is volume 3 of a large work on human mycopathology edited by Professor Polacci of Pavia. The author has summarized our knowledge of ocular diseases due to fungi and higher bacteria on a scale never before attempted. After an introductory chapter on the character of ocular mycoses in general, the material is arranged in chapters according to the various pathogenic organisms, each chapter containing a brief résumé of the biological characteristics of the organism and its importance in general pathology, followed by a complete account of its occurrence in ocular diseases. The most important cases are abstracted, a careful bibliographic list is appended to each chapter, and the 179 illustrations are taken from various articles in the literature, including the author's own contributions.

In the chapter on the actinomycetes the writer discusses his reasons for using the name actinomycetes to cover the whole group of finely branching thread-like organisms, and for discarding the names Nocardia, Discomyces, and Streptothrix, which were later used to describe varieties of the same organism.

The lesions described range from true actinomycosis of the lids and brow, sometimes arising from a tooth infection, through conjunctivitis as described by Pereyra, Saint Sevrin, and others, and concretions of the meibomian glands, to the well-known concretions of the canaliculus, which the author believes have probably all been due to actinomycetes. He believes that some of the conditions ascribed to Leptothrix aside from these concretions were really caused by actinomycetes, including the cases of Parinaud's conjunctivitis in which Verhoeff found a filamentous organism in sections. Cultures were never obtained, and, although Verhoeff believed the organism to be a leptothrix, Axenfeld called attention to some points of similarity between the threads and the actinomycetes, and the reviewer's description of the extreme delicacy of the threads as suggesting actinomycetes is also quoted. With less justification, the reviewer's cases in which leptothrix was found on the conjunctiva and in the meibomian secretion are included among these conditions, although here pure cultures of leptothrix were obtained. The intraocular infections in which Fuchs and Verhoeff found granules resembling actinomycetic granules, but in which evidence of a true actinomycotic infection was not complete, are described, and several cases of undoubted actinomycosis of the orbit, in some of which, as in Axenfeld's case, the primary focus was in the paranasal sinuses. In some of these intensive iodine medication, combined with removal of the focus, was successful, but vision often suffered seriously, and one case at least was fatal.

In a chapter on mucormycoses, Cavara's own case of keratomycosis is described, the only case in which evidence of invasion of the cornea by this species of mold was complete, and experimental work is described proving that this mold can produce keratomycosis in animals.

The lesions caused by the blastomycetes have chiefly involved the lids,

this being a favorite site of invasion by this organism in generalized blastomycosis. In three cases blastomycetes or yeast-like organisms have apparently caused conjunctivitis, and McKee described an involvement of the cornea in generalized blastomycosis, the organisms being found in the cornea.

Of the tinea group, Microsporon has rarely been reported as invading the lids, while Trichophyton has been found more often, causing lesions of the smooth skin and of the cilia and brows. The picture of severe blepharitis may be produced, the suggestion of a mycotic origin being given by the presence of groups of broken cilia, surrounded by areas of inflammation. About twenty cases are reported in which favus has involved the lids alone, and others in which such involvement was an incident in a more generalized skin eruption due to Achorion schönleinii. Large indolent ulcers are formed, usually single and covered with crust or scutula which represents colonies of the organism. The lash border is rarely involved by this organism.

The ocular lesions due to Penicillium and Aspergillus, aside from a few cases in which the conjunctiva was involved, have been chiefly keratomycoses, and since Leber's original report in 1879 a large number of such cases have been reported. Only two of these, apparently, those of Ball and Zentmayer, were reported in America (not including the reviewer's case, very recently published). Ulcerative, nodular, and a rare infiltrating form are described. In a few cases, the interior of the eye and of the orbit have been involved.

A complete account is given of the reported cases of ocular sporotrichosis, which have involved the lids, conjunctiva, cornea, lacrimal apparatus, orbit, and interior of the eye. Here the American literature plays a larger part than in the chapters dealing with other organisms. The author recognizes a number of distinct genera of pathogenic sporothrices, and does not mention the work of Davis with its evidence that the important groups are really identical, and so properly called Sporothrix schenkii, after the prior observer.

Short chapters are devoted to some of the rarer fungi.

This book should be read with much interest by ophthalmologists interested in the mycoses, and will be an invaluable reference book to anyone reporting a case.

S. R. Gifford.

Der graue Altersstar, seine Ursachen und seine nichtoperative Behandlung. (Gray senile cataract, its causes and its nonoperative treatment.) Prof. Dr. A. Siegrist, Director of the University Eye Clinic, Bern. About 400 pages, with 93 reproductions in the text, some of them multicolored. Urban and Schwarzenberg, Berlin and Vienna, 1928. Price, unbound 36 marks, bound 39 marks.

The object of this volume is to present the author's special views on the etiology of senile cataract and on the possibilitiy of nonoperative treatment, by way of prevention, or of arrest in the early stages. He admits that the question is an open one, and remarks that of many views none has been proved.

The study of senile cataract has undergone unexpectedly rapid progress in recent years, chiefly as the result of investigation with slit-lamp under the leadership of Vogt, as may be appreciated by looking through Vogt's atlas of the slit-lamp. Some progress has also been made of late in the chemical study of the lens and of cataract.

An important section of the volume is devoted to a survey of the views of medical writers on cataract, in antiquity, in the middle ages, and in recent times. Free use is made of illustrative cases from the literature bearing upon the opinions of modern authors. In relation to Siegrist's views with regard to etiology, a chapter is devoted to tetany and tetany cataract, another to myotonic cataract, another to

cataract accompanying skin diseases which depend upon disturbance of the endocrine glands, and another to tetany cataract in parathyroidectomized rats and rabbits.

At the conclusion of the chapter on cataract with dermatoses, the author declares that in all those cataracts which accompany certain skin affections definitely connected with disturbances of the endocrine glands, such disturbances of the endocrine have either a direct significance as regards the development of the cataract, or an indirect significance by their influence upon the sympathetic nervous system.

Siegrist's theory is that senile cataract is to be attributed to definitely established senile changes in the endocrine glands, and that, as a necessary corollary of this assumption, senile cataract is capable of being influenced by replacement of the corresponding hormones, "equally with other senile changes". He does not claim that well developed cataractous changes can be cured, but that cataract may be preventable, or at least may be arrested in its earlier stages.

Upon this basis the author has prepared, and has used for ten years, extracts of the various endocrine glands in a powdered form, chiefly composed of the genital glands and the thyroid and parathyroid (more recently placed upon the market by the German firm of Joachim Wiernik and Company, Berlin, under the title "euphakin").

Of thirty-two patients who were treated with this preparation over a length of time sufficient to form an opinion (none of the cataracts being purely nuclear), all failed to show further loss of vision while under treatment, and two-thirds showed a slight improvement in vision. For the majority of the improved cases no definite changes in the cataract would be demonstrated. Some cases showed a rapid change for the worse when the treatment was stopped, and in a few of these cases a repeated improvement was observed upon resumption of the treatment.

The book is well indexed, and carries extensive bibliographies. *W. H. C.*

Diseases of the throat, nose, and ear. By Dan McKenzie, M.D., F.R.C.S.E., President, 1926-27, Section of Otology Royal Society of Medicine, etc. Second edition, two volumes. Price $17.00.
American edition by the C. V. Mosby Co., Saint Louis.

Although but eight years have intervened between the first and second editions of this publication, the author states that because so much of interest and of practical value has been added since the first edition the second has been enlarged one-third. This does not apply to the number of pages but to the subject matter, and has been made possible through change of type.

Otolaryngology is dealt with in a comprehensive way. Though unprofitable padding is omitted to make the work concise, it still deals with all necessary details. There are 70 pages devoted to the pharynx and tonsils; 138 pages to the larynx and trachea, including foreign bodies, bronchoscopy, a most excellent description of laryngofissure and laryngectomy, well illustrated; 109 pages to the nose and nasopharynx; 62 pages to the accessory sinuses; and 224 pages to the ear.

Timely questions are discussed, giving the author's views. For example: it is stated that in latent sinusitis of the antrum there may be no history of purulent discharge from the nose or other objective or subjective manifestations, in spite of the condition causing symptoms such as headache, neuralgia, bronchitis and general ill-health. In these cases the author depends for diagnosis upon puncture and irrigation, which should be fortified by bacteriological examination of the return fluid according to Watson-Williams. This is rather insufficient to establish a positive diagnosis. No mention is made of injecting contrast fluids for greater accuracy in x-ray examinations.

To the ophthalmologist the chapter on oculoorbital complications is par-

ticularly valuable. The author states that it is difficult to believe that glaucoma and cataract are ever due to sinusitis. Retinitis, choroiditis and iridocyclitis are sometimes traced to septic foci in the nasal sinuses. Paralyses and retrobulbar neuritis are often induced by postethmoidal or sphenoidal sinusitis. The latter, of all ophthalmic diseases, is of extreme importance, and no delay should be made in deciding whether or not the nasal sinuses are responsible. McKenzie quotes authors showing that as high as seventy per cent of these cases are due to nasal sinuses and as few as seven per cent according to others. Retrobulbar neuritis may occur in antrum suppuration, which does not necessarily have to be upon the same side, the toxins reaching the nerves through the blood stream. Owing to the fallibility of our diagnostic methods it is perhaps safer to open the sinuses even if they are not obviously suppurating. The sphenoid sinus of both sides should be opened up even when the eye symptoms are only unilateral.

Attention is called to "spreading osteomyelitis" starting from infected sinuses. Cases have recently been reported of extensive invasion of the bone resulting in most serious if not fatal consequences, and the discussion of this subject is most timely.

The diagnosis of sinusitis in children is not easy. Transillumination is seldom reliable. In puncturing the antrum in children under three years of age it is recommended to insert the needle above and not below the inferior turbinal.

In discussing diseases of the larynx, tuberculosis is given considerable prominence. Reference to St. Clair Thompson's special report is recommended. The early diagnosis offers a better chance for recovery, and therefore cases in sanatoria where routine examinations are the rule are more favorable, being less advanced than those coming to throat clinics. This view of the prognosis of laryngeal tuberculosis should be emphasized, for the unfavorable view of this complication is still too common with the profession in general as well as with specialists.

In discussing malignant diseases of the larynx, the differential diagnosis is made fairly clear. One is cautioned as to accepting the therapeutic test by the reminder that improvement after the administration of potassium iodide should not be definitely regarded as excluding cancer.

Affections of the trachea and esophagus constitute a valuable chapter in that practical hints are emphasized, stress being laid upon diagnosis.

Intranasal dacryocystotomy is described, following the technique of West. A description of the Mosher-Toti operation might have found a place here to advantage.

A general survey of this book places it as up-to-date, omitting no timely topic, dealing with pathology sufficiently for a clear understanding, the result being on the whole a work of much practical value. *Robert Levy.*

Die Labyrinthreflexe auf die Augenmuskeln nach einseitiger Labyrinthexstirpation (Labyrinthine reflexes on the eye muscles after unilateral extirpation of the labyrinth); with a short account of the nervous mechanism of vestibular eye movements. Dr. R. Lorente de Nó, assistant of the Cajal Institute, Madrid (at present in Upsala). Octavo, 205 pages, with 186 illustrations in the text and on 22 plates. Berlin, Urban and Schwarzenberg. 1928. Paper covers 15 marks, bound 18 marks.

Under a subsidy from the Spanish government, the author, a pupil of Ramon y Cajal, spent three years at Upsala, where clinical material was furnished by Professor Bárány. The book is a statement of the results of experiments conducted during that time with regard to the physiology of the vestibular centers and tracts, a subject which has hitherto received little attention in the literature. The volume, highly technical, is freely illustrated, especially with drawings to

show the regions of the brain involved in the experiments, and with electronystagmographs.

The author summarizes his conclusions as follows: It seems to be established that the occurrence of the quick phase of nystagmus, as Bárány maintained in 1907, depends upon the integrity of the substantia reticularis in the pons; and it seems that there must be a connection between the vestibular nuclei and the neurons from which the quick phase of nystagmus is released. How this connection is made up, and what is the internal mechanism of the nystagmic discharge, can not yet be determined. That, as regards both the slow and the quick phase of the nystagmus, the necessary stimuli originate in the peripheral labyrinth (in the absence of other, for example optic, stimuli) seems to have been established by the author's experiments. Naturally, this does not involve the belief that each of the two phases of nystagmus is independent of the other terminal point in the labyrinth, but merely that an individual stimulus releases a diphasic reflex, perhaps from the crista of a semicircular canal, just as for example the skin stimulus releases the scratching reflex. *W. H. C.*

CORRESPONDENCE

On entrusting the patient with cocaine solutions

My old friend Würdemann on page 322 of the April number of this journal asks: "Does any reliable practitioner give cocaine drops into the hands of the patient?" Without making any claims to reliability I will state that I do. Not, however, on the generous scale which he was justly criticizing. Where I have removed a foreign body from the cornea, or have removed a pterygium, or have to deal with any other condition which leaves an insignificant corneal lesion liable to keep the patient awake, or from work which he might otherwise safely do, I frequently give a supersaturated solution of boracic acid with one-fourth to one-eighth grain of cocaine to the ounce. I give the same in many cases of irritation of the eyes without any discoverable cause. Used in this way two to six times a day, I have never had any but the most satisfactory results from giving cocaine into the patient's hands. Furthermore, I often give patients somewhat stronger solutions (up to four grains to the ounce) to mitigate the pain otherwise caused by the sharper collyria, such as zinc from 0.5 per cent up; or one or two per cent mercurochrome. Such mitigation is almost essential where the parents are expected to use such collyria in children's eyes, and is most welcome to the average adult. The patent fact that the epithelium peels off readily from a well cocainized cornea would be expected to deter anyone from using stronger solutions freely in the presence of serious surface infection, and when a man of considerable experience (as in the case cited by Würdemann) deliberately advises the use of cocaine four per cent every two hours or oftener for purulent ophthalmia, it may well call for exclamations of protest and alarm; but it also may raise the question as to whether such solutions are really as dangerous as is commonly believed. The belief in the directly destructive action of cocaine on the corneal epithelium has undoubtedly been much exaggerated through neglecting to separate the action of the cocaine from that of the drying resulting from infrequent winking. It is astonishing how much cocaine may be used on a cornea without visible exfoliation, if the surface be kept quite wet or if the lids be kept closed between drops.

Harold Gifford.

Omaha

ABSTRACT DEPARTMENT

Abstracts will be classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases, including parasites
18. Hygiene, sociology, education and history

---

1. GENERAL METHODS OF DIAGNOSIS

Hass, Émile. **On the visual acuity with dim illumination.** Arch. d'Opht., 1927, v. 44, pp. 546-551.

Using the Landolt broken ring as a test object, the acuity of vision is measured under varying degrees of illumination. The results are similar to those of previous workers. The visual acuity rises rapidly with increasing illumination up to twenty lux. At this point there is a very sharp bend in the curve, and the acuity increases but little beyond this. This sharp bend in the curve the authors regard as contrary to the usual physiological phenomenon, and they suggest that further experiments may show a more gradual change. *M. F. Weymann.*

Holth, S. **An indelible "three object" comparative test for central color scotoma—also in cases of congenital color abnormality.** Brit. Jour. Ophth., 1928, v. 12, June, p. 309.

This is a description of the author's instrument for the detection of central and paracentral color scotomata, due to axial intoxication of, or axial inflammation in, the optic nerve. The instrument consists of a black ebonite rule, 16 cm. long, 2 cm. broad, and 5.5 mm. thick. On each of the four sides of the rule there are drilled three round holes, each one mm. deep; the three holes having a mutual distance of four cm. On one of the broad sides there is inlaid a bright red celluloid disc in each of the fifteen mm. holes; on the other broad side is inlaid a pink celluloid disc in each of the ten mm. holes. On each of the two narrow sides the holes are three mm. in diameter and are filled with melted sealing wax; one side being light blue and the other pure yellow.

The rule is held horizontally eighteen inches from the examined eye, with the upper edge of its surface inclined a little forward, in order to eliminate every trace of reflexes from the surfaces of the three objects. The patient gazes at the central object. In cases with no central color scotoma all three objects on a given surface have the same color. The presence of either a central or paracentral color scotoma is determined by discoloration of the central object, one of the peripheral objects, or a combination of two or all three objects. After the eye is examined with the rule held at 180 degrees it should then be examined with the rule turned to 90 degrees. The author has observed central color scotoma in sympathetic uveitis, ordinary chronic iridocyclitis, and anterior uveitis. He at first thought the scotomata

were due to secondary retrobulbar neuritis but has later believed that most cases were due to an intoxication of the optic nerve from resorption of intraocular inflammatory toxins. (Three illustrations.)

D. F. Harbridge.

Szymanski, J. **Half-Elliot operative technique,** Zeit. f. Augenh., 1928, v. 64, April, p. 373. (See Amer. Jour. Ophth., 1928, v. 11, July, p. 580.)

2. THERAPEUTICS AND OPERATIONS

Giannantoni, C. **Hemophilia in ophthalmology.** Ann. di Ottal., 1927, v. 55, May-June, pp. 642-646.

The author reviews the condition of hemophilia in general and especially the reports of ophthalmologists bearing upon it. Severe hemorrhages from the eye and adnexa have usually appeared associated with hemorrhages from other organs. A number of cases have been reported, however, where the only hemorrhages were from the lids and conjunctiva, some of these proving fatal. Such a case was that of the baby observed by Miller, in which following the instillation of one percent silver nitrate, hemorrhage of the conjunctiva began which resulted in death on the fourth day. Spontaneous hemorrhages in the orbit have been observed fairly often, producing hemotoma of the lids and cheek and in some cases marked exophthalmos. Severe hemorrhages from the conjunctiva in vernal catarrh have been reported. Hemorrhages of the conjunctiva have usually occurred after a slight injury such as an accidental abrasion or, as in Shurley's case, after scarification of the fornix for trachoma. The author concludes that a careful history should be obtained in every preoperative case so as to exclude hemophilia.

S. R. Gifford.

Marri, E. **The action of autoserum in ocular diseases.** Arch. di Ottal., 1927, v. 34, June, pp. 241-245.

Six cases are reported, four of phlyctenular keratitis, and two of keratitis complicating trachoma. Four to five injections were given, resulting in rapid relief of the pain and photophobia, with absorption of the infiltrates and return of the conjunctiva to normal.

S. R. Gifford.

Seefelder, Richard. **Concerning untoward effects of certain ointments in the treatment of eyes.** Wien. klin. Woch., 1927, v. 40, Jan., p. 23.

In five cases in which he used iodoform salve as a prophylactic before or after eye operations for injuries, Seefelder noticed that a pustular eczema of the lids and surrounding skin developed. There was marked swelling of the lids and conjunctiva, with a profuse discharge. The eczema spread to all places touched by the salve. Examination of the preparation showed the base to be chemically free, and the unpleasant reaction was no doubt due to an individual hypersensitiveness.

Beulah Cushman.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Adrian, E. D. and Matthews, R. **The action of light on the eye. Part 3, the interaction of retinal neurons.** Jour of Physiol., 1928, v. 65, June, p. 273.

This paper deals with the appearance of a rhythmic action-current discharge in the eel's optic nerve when the entire retina is steadily illuminated. The same rhythmic responses are obtained under the influence of strychnine, which suggests that the rhythm is due to the establishment of a nervous connection between the different ganglion cells of the retina similar to that established under strychnine between the different motor neurons of the cord. The authors conclude that the eel's retina is not a mosaic of receptors with each group leading by an independent pathway to the corresponding optic nerve fiber but that the same fiber is open to the spread of excitation from other parts of the synaptic layers. Conduction in the eel's retina is a process exhibiting many of the phenomena which may occur whenever a large

group of neurons can establish synaptic linkages with one another.

F. H. Adler.

Angelucci, A. **Vision and audition in the biologic processes of reaction and resistance.** Arch. di Ottal., 1927, v. 34, Jan., pp. 1-14.

This is a discussion of the physiology of vision and audition in their physicochemical aspects, and does not lend itself to abstracting.

S. R. Gifford.

Carmi, A. **The visual field at high altitudes in relation to fatigue.** Ann. di Ottal., 1926, v. 54, Oct., pp. 1108-1112.

In the "A. Mosso" laboratory on Monte Rosa, the author examined the fields of subjects fatigued from mountain climbing, and again after repose, and noted a constant increase in the fields for color in fatigued subjects. This was most marked for green, less for red and blue, while no constant change was seen in the field for white. A hyperemia of the retinal vessels was seen ophthalmoscopically in these persons. The increase in the fields may probably be interpreted as due to greater sensitivity of the peripheral retina resulting from the increased oxygenation of the blood. (Bibliography and field charts.) *S. R. Gifford.*

Gertz, Hans. **Addition to the article "New simple form of the fundamental relations of the optical system."** Acta Ophth., 1927, v. 5 no. 4, pp. 346-351.

Gertz adds many new and complicated formulæ of physiologic optics to his former paper, which appeared in the Acta, volume 5, page 137. The article is very technical and chiefly of interest to physicists, and is not adapted to an abstract.. *E. M. Blake.*

Hecht, Selig. **A quantitative basis for the relation between visual acuity and illumination.** Proc. of the National Academy, 1927, v. 13, pp. 569-574.

There exists no explanation of the curious but persistent dependence of visual acuity on illumination. The region of variation of visual acuity with increasing illumination is such that one must assume either that the number of sensitive elements per unit retinal area can vary nearly a hundredfold or that the number of elements in the retina can be varied functionally. Since the number of rods and cones in the retina is fixed anatomically, the latter is the assumption of choice. The author plots the integral frequency curves, giving the total number of functioning elements per unit area at the different retinal illuminations. At the lowest illuminations vision is mediated by the rods. The number of rods which function is small, which is equivalent to a resolving surface with the receiving elements sparsely distributed. The retinal distance between two just discriminable contours must be large, and visual acuity is low. As the illumination increases more and more rods become functional. The average distance between the functional elements becomes smaller and visual acuity becomes greater.

Presently an intensity is reached at which the cones begin to function. The cones come into play nearly ten times as fast as the rods because of their greater number in the fovea. Visual acuity then becomes a function of the foveal cones and continues to increase until all the cones are active. This curve corresponds well with the curve showing the relation between visual acuity and illumination, as originally given by Koenig. Further this theory satisfies the data obtained from completely color-blind individuals in whom with increasing illumination the cone portion of the curve disappears and only the lower rod limb remains.

Koenig computes that the whole range of intensities visible to the eye is made in only 572 discrete steps in intensity recognition. About thirty of these steps are mediated by the rods; the rest, 542, by the cones. If there is such a thing as a minimal retinal area which carries out all the functions of the retina as a whole Hecht concludes that the minimal retinal area must contain 542 cones or

some multiple of that number. The lowest visual acuity corresponds to a minimal retinal area of 0.04 square mm. and since there are 13,500 cones per square mm. of fovea it appears that at the fovea the minimal retinal area of 0.04 square mm. contains 540 cones, which is a striking agreement from two independent sources.

The same assumption of the statistical distribution of rod and cone thresholds is also applied to a basis for color vision. *F. H. Adler.*

Nicoletti, G. **Effect of the posterior surface of the cornea on total astigmatism in man.** Ann. di Ottal., 1927, v. 55 Nov.-Dec., p. 987.

The irregular curvature of the anterior surface of the cornea is responsible for the major part of astigmatism in the human eye. It has long been recognized that there exists a fairly uniform disparity in the ophthalmometric findings and the results obtained by subjective refractive tests. Tscherning and others demonstrated by means of the ophthalmophacometer that there exist opposing curves on the posterior surface of the cornea and on the posterior surface of the crystalline lens. In this way the present author explains the focal correction of the lower degrees of astigmatism. He admits, however, that no adequate explanation has yet been made for the accommodative correction of astigmatism of high degree. *F. Park Lewis.*

Tscherning, M. **The color of incandescent bodies.** Acta Ophth., 1927, v. 5, no. 3, pp. 298-307.

Tscherning disproves Planck's law, namely that the more one heats an incandescent body the more blue and violet rays will be emitted. The color in the beginning is red, passes into yellow, and finally becomes white. In a spectrum of great intensity all the blue and violet parts become white, and cannot neutralize the impression of yellow produced by the rest of the spectrum. The sensation increases with the logarithm of the stimulant. The supposition that the sensitiveness of the eye does not vary is erroneous, as is shown by the use of phosphorescent paper, which only slowly gives rise to sensation of light. Compensatory adaptation plays a great rôle in the function of vision; thus blues and greens may be distinguished with difficulty under artificial light but are easily recognized in daylight. *E. M. Blake.*

Waalen, G. H. M. **The hereditary characteristics of different forms of congenital red-green blindness.** Acta Ophth., 1927, v. 5, no. 4, pp. 309-345.

Waalen recognizes the usual four groups of congenital color-blindness: protanopes, deuteranopes, protanomalous and deuteranomalous. His material for this study consisted of 18,121 school children. The investigation of several color-blind brothers and their relatives shows that the particular factor in their heredity can be ascribed to the so-called "x-chromosome". For girls the frequency of color-blindness is scarcely one per cent, the majority being deuteranomalous. Among boys one per cent each for protanopes, deuteranopes and protanomalous were found. Five per cent of the boys were deuteranomalous. The author concludes that between eight and nine per cent of the men of Oslo are red-green blind. The article contains an extensive review of the theories of the hereditary characteristics of defects of color sense. *E. M. Blake.*

4. OCULAR MOVEMENTS

De Rosa, G. **The reflex of Tournay.** Arch. di Ottal., 1926, v. 33, Dec., pp. 538-543.

The literature bearing on this reflex, mydriasis of the abducted eye in lateral movements, since its description by Tournay in 1917, is discussed. Baer described the opposite condition, miosis of the abducted eye, in a case whose light reaction was absent. The author describes a similar case, associated with optic atrophy. He explains this anomaly as probably due to a diffusion of the stimulus from the center for abduction to the sphincter nucleus. He

explains the usual reflex of mydriasis in abduction as due to a rapid fatigue of the sphincter producing a mydriasis after a slight primary miosis during lateral movements. *S. R. Gifford.*

Holm, E. **Nystagmus in monocular vision.** Acta Ophth., 1927, v. 5, no. 4, pp. 387-399.

Holm collected thirty-one cases of nystagmus, most of which presented a common factor to which their nystagmus might be referred, since the great majority of these cases had monocular vision, presenting either congenital or early acquired loss of sight in one eye or lack of fusion in the two eyes. He concludes (1) that in cases of congenital or early acquired monocular vision jerking nystagmus is of frequent occurrence, in some cases in side glances only, in others also when the gaze is directed straight forward; (2) that in cases of strabismus associated with amblyopia nystagmus has not been detected, except in association with alternating squint; (3) that in cases of good vision of both eyes, and without strabismus, lack of fusion seems in some instances to account for the presence of nystagmus. *E. M. Blake.*

Sattler, C. H. **Apparent exotropia as a result of abnormally great distance between fovea and papilla.** Zeit. f. Augenh., 1928, v. 64, April, p. 349.

The left eye seemed to deviate outward because the angle gamma in this eye was fifteen degrees, while that of the right eye was two degrees. With the stereoscope the patient demonstrated perfect depth perception.

F. H. Haessler.

Vernieuwe. **Homolateral and heterolateral paralyses of the abducens nerve in the course of otitis.** (1 ill.) Bull. de l'Acad. Royale de Méd. de Belgique, 1927, v. 7, Dec. 17, pp. 807-831.

An ample discussion of this subject is based upon two cases, in each of which paralysis of the sixth nerve complicated acute otitis media. The first case corresponded closely to the description given by Gradenigo in 1904, of a syndrome including acute otitis media, as seen in the choroidal and occipital regions, and paralysis of the abducens, usually discovered by the patient himself. This case went on to mastoiditis, which, although operated upon, was followed a week or so later by leptomeningitis and death. In this case the abducens was involved on the same side as the ear. In the second case the affected ear and abducens were on opposite sides. In the second case the patient, who was a diabetic, recovered from a mastoiditis and from paralysis of the abducens but there was a recurrence of the abducens paralysis after six months, coinciding with a dietetic escapade and increased glycosuria. The denomination "Gradenigo's disease" should be reserved for cases in which the paralysis of the sixth nerve is homolateral. This paralysis is attributable to a bony lesion at the tip of the petrous portion of the temporal bone.

W. H. C.

5. CONJUNCTIVA

Accardi, V. and Alajmo, B. **Trachoma and follicular affections of the semilunar fold.** Arch. di Ottal., 1927, v. 34, May, pp. 229-238.

The author examined a number of cases of trachoma with especial attention to involvement of the semilunar fold. He found it to be involved very early, showing numerous follicles when the only other portion of the conjunctiva to be involved was the upper fold. Sometimes only a diffuse thickening was present. In later cases the fold atrophies and may disappear entirely. Sections showed a typical picture of trachomatous infiltration affecting the whole thickness of the fold. In follicular conjunctivitis, on the other hand, the fold is seldom involved early and diffuse follicles which develop later are superficial and heal without scarring. Sections in this condition show no degeneration of the epithelium nor necrosis, in contradistinction to the findings in trachoma. *S. R. Gifford.*

De Rosa, G. **The cicatrization of the trachoma granule and the tuberculous granuloma.** Arch. di Ottal., 1927, v. 34, June, pp. 280-285.

This is a comparison of the healing processes in these two conditions, as seen in sections. *S. R. Gifford.*

Kankrov, A. L. **On Prowazek formations in trachoma.** Russkii Opht. Jour., 1928, v. 7, May, pp. 598-608.

After subconjunctival injection of 0.1 per cent of copper sulphate the author could find Prowazek formations in the majority of those cases of trachoma where these inclusions could not be detected otherwise. Among three thousand trachoma patients he found Prowazek formations as follows: (1) in the granular stage without pannus, in 35 per cent, and in 95 per cent when using copper sulphate as a provocative; (2) in the granular stage with pannus, in 37 per cent, and in 97 per cent after copper sulphate injections; (3) in the cicatricial stage, in 3 per cent, and in 15 per cent after copper sulphate. In 477 cases of folliculosis Prowazek bodies could not be found either before or after the use of subconjunctival copper sulphate injections. The author advocates the use of these injections for the diagnosis of trachoma in doubtful cases. He also considers them of the highest value in the treatment of trachoma. *M. Beigelman.*

Lo Vecchio, G. **Chaulmoogra oil in treatment of trachoma.** Arch. di Ottal., 1927, v. 34, June, pp, 259-261.

Daily massage of the lids with applicators dipped in chaulmoogra oil, as recommended by Delance in Morocco, was tried in a series of cases. While some improvement in the condition of the lids was observed, especially at first, the condition often became stationary without progressing to a cure, and the author's experience does not lead him to recommend the method. *S. R. Gifford.*

Luppino, G. **The etiology of lymphatic keratoconjunctivitis in infants.** Ann. di Ottal., 1926, v. 54, Nov., pp. 1209-1221. (See Section 6, Cornea and sclera.)

Morelli, E. **The influence of diet on the ocular diseases of infancy.** Arch. di Ottal., 1927, v. 34, June, pp. 273-279.

The author produces pseudo-phlyctenules in animals sensitized to certain substances, by instilling these substances later into the conjunctival sac. In animals whose state of nutrition was lowered by injections of mercury, instillation of tuberculin produced nodules at the limbus, while in tuberculous animals, instilling of staphylococcic toxins produced true phlyctenules. Besides the diseases of xerophthalmia and hemeralopia which are definitely due to vitamine deficiency, the condition of phlyctenulosis may be produced by improper diet causing enteritis, with resulting absorption of toxic products from the alimentary canal. These give rise to anaphylactic phenomena of which the phlyctenule is one manifestation. This condition appears most often about the fourth year of life, when the diet is being changed. It is often possible, by means of skin tests, or by observation of crises of vomiting, diarrhea, or urticaria, to determine the offending article and remove it from the diet.

S. R. Gifford.

Renard, Gabriel. **Polyvalent vaccines in ocular infections.** Arch. d' Opht., 1928, v. 45, June, p. 368.

For the treatment of gonorrheal conjunctivitis, a vaccine was devised which contained not only the gonococcus but also other organisms found associated with it in ocular infections. Only cultures taken from ocular infections were used and the organisms were killed by heat. In each c. c. of vaccine there were three billion each of gonococci, pneumococci, and staphylococci, one billion each of streptococci and enterococci, and five hundred million xerosis bacilli. To this was added a quantity of filtrate of emulsion of Bacillus pyocyaneus. The initial dose of vaccine 0.25 c.c. was increased to one c. c. or more. Eighteen adults and twenty new-born infants with gonor-

only two adults were there perforations of the cornea, and these occurred within forty-eight hours after the patients were seen. The recession of discharge and the general improvement were remarkable with the use of the vaccine. The usual local treatment was carried on at the same time. In nongonorrheal infections the vaccine proved of greatest value in postoperative infections. It was concluded that a properly made vaccine was of great value in the treatment of ocular infections, especially if treatment was begun early. *M. F. Weymann.*

12. VISUAL TRACT AND CENTERS

Linneu, Silva. **Pupillary sign of hemianopsia.** Arch. de Oft. de Buenos Aires, 1928, v. 3, April, p. 322.

A method for eliciting the Wernicke sign of hemianopsia is presented, consisting not in an actual absence of pupillary reaction from the involved side of the retina, but a relative difference between the reflexes arising from the two sides.

The eye is illuminated very obliquely, first on the side supposedly normal, and the degree of pupillary contraction carefully noted or even measured. The same is then repeated on the supposedly involved side, and the degree of reaction again found. Any marked difference between the two is regarded as sufficient evidence to claim a modified Wernicke reaction, arising in an involvement anterior to the primary visual centers. *A. G. Wilde.*

Lutz, Anton. **Binasal hemianopsia.** Graefe's Arch., 1928, v. 119, p. 423.

The author presents a detailed tabulation of eighty-four cases of binasal hemianopsia from the literature and a description of two cases of his own observation. His review of the literature demonstrated to him that the occupation of those affected had no significance. In regard to the sex, among seventy-two cases in which this was reported fifty-one were males and twenty-one were females. As to the age, among sixty-six cases whose age was given, thirteen were older than forty years, seventeen were younger than twenty years, and thirty-six were in the third and fourth decades.

Regarding the cause of binasal hemianopsia, autopsy was made in but eleven of the eighty-four cases: in nine brain tumor was present. In addition, three cases of Cushing and Walker were found at operation to be due to brain tumor. In seventeen other cases there were present sufficient general and localizing symptoms to make the diagnosis of brain tumor probable. Since subtentorial tumors, like ventricular tumors, early and strongly obstruct the lymph flow of the ventricles, we can conclude that in choked disc with binasal hemianopsia, seventy-five per cent of the cases have tumors of the brain, including twenty-five per cent in the ventricles and fifty per cent subtentorially located. Less frequently than brain tumor as the cause of binasal hemianopsia, there were found vascular changes in the circle of Willis, dependent upon arteriosclerosis, infectious diseases, lues and trauma, particularly aneurysms which injured the optic nerve, either directly or indirectly by limiting space. In tabes dorsalis and hysteria, binasal field deficiencies were found.

The central vision was almost always greatly diminished: at times a central scotoma was present. Binasal hemianopsia never began with binasal scotomata, and never did it suddenly occur in both eyes; one eye was always affected first and then after a shorter or longer time the other became affected. Ophthalmoscopically, a choked disc might be present, a neuroretinitis, or a simple optic atrophy; on the other hand the fundus might show no apparent changes.

H. D. Lamb.

Roelofsz, C. O. **Optical localization following operation for strabismus.** Arch. f. Augenh., 1928, v. 99, May, p. 145.

Roelofsz' patient, a fifteen-year-old girl, had divergent strabismus. In addition, she had a left-sided involvement from a previous infantile paralysis.

Following careful neurological study, a bilateral tenotomy of the external recti was done with a satisfactory result. The patient had a very unusual type of optical localization, together with a left-sided hemiamblyopia. A careful study of this case caused the author to conclude that at the time of the infantile paralysis two separate foci were involved, as it was impossible that one focus should produce paralysis of an arm and leg, strabismus, and an arterial hemiamblyopia.

Frederick C. Cordes.

Sven, Ingar. **Argyll Robertson pupil and ptosis in basal luetic brain disease.** Acta Ophth., 1928, v. 6, no. 1, pp. 11-54.

Sven confirms the opinion of others that syphilis is the chief cause of light-rigid pupils and that the toxin of this disease shows a predilection for light-reflex paths. Other causes are disseminated sclerosis, polioencephalitis hemorrhagica superior, epidemic encephalitis, chronic alcoholism, trauma, diabetes mellitus, and tumors and pathological processes in the walls of the third ventricle about the aqueduct of Sylvius.

The syphilitic process runs a characteristic course. The pupillary reaction to light is at first only lessened and slowed down. At this stage different portions of the pupillary border are affected, explaining the irregular pupil seen. Anisocoria is the rule. Later there is miosis, which increases with the rigidity of the pupil. No other disease causes such a degree of miosis. The contraction of the sphincter becomes peristaltic or worm-like. The miosis is very rarely unilateral.

The writer traces the development of the light-reflex pathways from lower animals to man. Upon developmental grounds it is to be expected that the apparent pupillomotor paths will be found upon the surface of the optical system in the midbrain. Since metaluetic disease manifests itself in the midbrain through early peripheral, subpial degeneration, the pupillomotor paths will be early affected. The reflex rigidity of the pupil to light is thus the result of a simple luetic meningitis. The isolated ptosis is a further evidence of this process.

E. M. Blake.

13. EYEBALL AND ORBIT

Castello, B. **The endothelial reticulum of the eye,** Ann. di Ottal., 1927, v. 55, July-Aug., pp. 607-620.

The author describes the endothelial reticulum as found in other structures of the body, and quotes previous investigations of its distribution in the eye. Its structures are best examined by differential stains. The author injected rabbits intravenously with five per cent carmine solution and sacrificed them at intervals. The carmine granules were found in the largest amounts in the choroid and in lesser amounts in the lacrimal glands, conjunctiva, sheaths of the optic nerve, sclera, and Harder's gland (peculiar to the rabbit.) The author believes the great development of this system in the uveal tract is due to the latter's function as a defense mechanism.

S. R. Gifford.

Castex, M. R., Cassafousth, C., and Ontaneda, L. **Syphilitic osteoperiostitis at the apex of the orbit.** Arch. de Oft. de Buenos Aires. 1928, v. 3, March, pp. 255-264.

A young woman, suffering from diabetes and with some suggestions of hereditary lues, presented the following syndrome: (1) retrobulbar optic neuritis of the left eye; (2) paralysis of the inferior branch of the oculomotor and of the abducens on the same side, and (3) neuralgia of the ophthalmic branch of the left trigeminus.

Assuming that the involvement of four cranial nerves (2, 3, 4, 5), in this case was due to a single lesion, the authors localized the latter at the apex of the orbit. In the absence of a history of trauma and of symptoms characteristic for a retrobulbar neoplasm, an osteoperiostitis of probable syphilitic origin was held responsible for the reported syndrome.

M. Beigelman.

Merculov, I. I. **Chloromatous neoformations and their roentgenotherapy.** Russkii Opht. Jour., 1928, v. 7, pp. 621-630.

In view of changes in the blood picture typical for myeloblastic leukemia, of tenderness in the bones, of an acute course, and of the patient's youth, a bilateral orbital tumor suggested a diagnosis of chloroma. Roentgen therapy brought considerable relief and almost complete disappearance of the exophthalmus, but the improvement was only temporary and the patient died in two months. Autopsy confirmed the diagnosis.

M. Beigelman.

Morelli, E. **Final contribution to the study of ocular infection by micrococcus melitensis.** Ann. di Ottal., 1926 v. 54, Nov., pp. 1206-1209.

In a previous work, the author proved experimentally that Micrococcus melitensis was capable of producing lesions of the cornea, iris, and vitreous of a characteristic type, showing a marked tendency to the production of localized infiltrations which finally resolved. Corneal lesions showed the same greenish fluorescence seen in cultures of the organism. Ocular lesions gave rise to systemic infection of the animals. The author now reports that a further series of animals inoculated in the cornea, anterior chamber, and vitreous, with production of the characteristic lesions, showed positive agglutination for the organisms in their serum, in dilutions as high as 1 to 800. In four animals, the intact conjunctival sac, after obliteration of the tear-points, was inoculated daily for several months with cultures of the same organism, with negative results, showing that the intact conjunctiva presents an efficient defense against invasion of the organism.

S. R. Gifford.

Reese, Warren L. **Developmental defects of the internal structures of the eye.** Atlantic Med. J., 1928, March, p. 394.

Developmental defects are of more practical interest in clinical ophthalmology than many clinicians realize, and, with this idea in mind, the various intraocular developmental malformations are considered.

D. H. O'Rourke.

Weinberger, N. T. **Developmental defects of the external structures of the eye and orbit.** Atlantic Med. J., 1928, March, p. 386.

The various developmental defects of the external structures of the eye and orbit are considered, and a sufficient number of case reports are interjected to make the paper not only instructive, but interesting. Twenty-six references are appended.

D. H. O'Rourke.

14. EYELIDS AND LACRIMAL APPARATUS

Blanco, Tomas. **Canalicular trachoma.** Arch. de Oft. Hisp-Amer., 1927, March, v. 27, p. 199.

Old cases of trachoma have usually more or less involvement of the lacrymal drainage system, along with the other better recognized complications. Granulations are liable to arise in the canaliculi, and this is responsible for the intractable epiphora so frequently seen. The walls of the sac may also be affected, examination of sections after extirpation often showing trachomatous changes. When the canaliculus is affected that portion of the lid margin is rounded and expression will cause a small drop of secretion to appear in the punctum. The punctum itself is generally dilated and somewhat elevated. Granulations can at times be seen occupying a punctum. Treatment is curettage of the canaliculi and application of solution of bichloride 1:100 to the walls. The condition is reported to yield readily to a few applications.

A. G. Wilde.

Bursuk, G. G. **Operation for ptosis.** Russkii Opht. Jour., 1928, v. 7, May, pp. 609-614.

A horizontal incision is made through the lid at a distance from the ciliary border slightly greater than the difference between the heights of both

lids (in cases of unilateral ptosis), and the skin is dissected down to the roots of the eyelashes. Three doubly-armed sutures are passed through the exposed orbicularis, so that the loops are placed immediately below the upper lid of the wound, and the threads are passed in front of the tarsus and back of the orbicularis, until they emerge in the intermarginal space. After some cauterization of the orbicularis below the loops, the threads are tied, and thus the basis of the eyelashes is brought up to the cauterized part of the orbicularis. The sutures are removed in five days. While the immediate appearance of the eyelid is bad on account of a temporary ectropion and of a considerable edema of the lid, the final results are highly satisfactory.

M. Beigelman.

Casadesus Castells, F. **Dacryocystorhinostomy.** Arch. de Oft. Hisp.-Amer., 1927, March, v. 27, p. 153.

The operation advocated by the author is a modification of the West-Polyak technique, the results of eighteen cases being reported. Based upon these, the following are his conclusions:

(1) Dacryocystorhinostomy is the operation of election in cases of epiphora or inflammations of the sac, extirpation being reserved for those cases showing deep lesions, either specific or neoplastic, or for use after the advocated procedure has definitely failed. (2) The endonasal route has relieved seventy per cent, bettered thirteen per cent, and failed in seventeen per cent. (3) The author's modification of the West-Polyak method is of short duration, causes little trauma, leaves no external wound, and can be done in an office. (4) Cases of congenital epiphora or those with external fistula are especially amenable to the endonasal operation.

A. G. Wilde.

De Rosa. **The surgery of senile ectropion.** Arch. di Ottal., 1927, v. 34, Jan., pp. 15-19.

The author discusses the operations most commonly employed for senile ectropion. The Duverger operation produces a vertical scar of the tarsus and conjunctiva which may cause irritation of the cornea, and also a vertical scar in the skin involving the orbicularis muscle which may weaken this muscle and predispose to recurrence. Szymanowsky's procedure involves the skin alone and does not take into consideration the enormous thickening of the conjunctiva present in some cases. The Kuhnt operation leaves a vertical conjunctival scar and does nothing to correct the laxity of the skin. The author proposes a combination of the last two procedures, prolonging the Szymanowsky incision three or four millimeters into the lid border from the external angle and removing a triangle of conjunctiva the same size as the triangle of skin which is excised from beyond the external angle. This allows the skin incision to close without puckering and brings the conjunctival scar where it can not irritate the cornea. Photographs of a bilateral case with a good result are given.

S. R. Gifford.

Manes, A. J. **Toti operation for radical cure of epiphora.** Semana Med., 1928, April 26, p. 1020.

The author had previously made a report of a number of cases of epiphora in which he had done a dacryocystorhinostomy according to the technique of Dupuy-Dutemps and Bourguet. While in the main he was satisfied with results, he has since turned to the Toti operation as modified by Arrugo, which he now uses exclusively.

The chief point in favor of the newer method is the saving of time, each operation now consuming about fifteen minutes, in comparison to an hour and a half to two hours previously. He describes the technique in which he endeavors to avoid the angular artery in the primary incision, and also leaves undisturbed the canthal ligament. The sac is freed from the lacrymal fossa and is retracted internally. The bony opening is then made with a trephine seven mm. in diameter. The nasal mucous membrane is incised, a portion removed from the adjacent part of the

sac, and the two sutured together with fine catgut. Emphasis is laid on the fact that nasal respiration must be good, or must be first established by appropriate nasal surgery.

Ninety cases are reported in some detail, with improvement or cure in sixty-two per cent. The author believes the next series of ninety will show even better results on account of minor improvements in technique.

A. G. Wilde.

Manor, A. J. **Toti's operation: is it a radical cure of lacrimation?** Arch. de Oft. de Buenos Aires, 1928, May, pp. 368-386.

Finding Dupuy-Dutemps's plastic dacryocystotomy too complicated and tedious, the author accepted Toti's procedure with Arruga's modification (trephining the bone), as published in the Archivos de Oftalmologia Hispano-Americanos, May, 1927. He used this method in 90 cases, and finds its main advantage in its simplicity. In 62 % of his cases the lacrimation disappeared, the period of observation being from a few weeks to several months. *M. Beigelman.*

Meyerhof, M. **Palpebral hydatids.** Ann. d'Ocul., 1928, v. 165, April, pp. 247-251.

Gabriélidès, reviewing this subject in the Annales, concluded that the condition was that of oily or dermoid cysts. The ancients describe a condition which suggests a hernia of orbital fat into the lid. Meyerhof believes that this lesion can be nothing else but an edema of the lid. *L. T. P.*

Nicoletti, G. **Papilloma of the inferior canaliculus, of palpepral origin.** Ann. di Ottal., 1926, v. 54., Nov., pp. 1124-1226.

The author's case showed a tumor occupying the whole thickness of the lid, and raised three mm. above it, occluding entirely the lower punctum, and giving rise to lacrimation. Sections showed a typical papilloma. A chronic conjunctivitis and several previous probings were considered as possibly having caused the original epithelial proliferation. (Bibliography and two illustrations.)

S. R. Gifford.

Ploman, K. G., Engel, A., and Knutsson, F. **Experimental studies of the lacrymal passageways.** Acta Ophth., 1928, v. 6, no. 1, pp. 55-87.

Ploman, Engel, and Knuttson studied the mechanism for the conveyance of tears from the conjunctival sac into the nasal cavity in healthy subjects by means of lipiodol injections and volumetric experiments. Numerous x-ray plates are reproduced, the technique is discussed, and motion pictures of the act of winking are incorporated into this valuable and comprehensive article. The writers have shown that in forcible contraction of the orbicularis the upper part of the sac remains unchanged or becomes distended, while the lower part of the sac and upper part of the lacrymonasal duct are compressed both in the sagittal and frontal diameters. Volumetric experiments show that a decrease in volume occurs. In normal winking a less marked decrease occurs. Cinematographic records demonstrate that decrease in volume of the sac is definitely related to the lid movements, in that the decrease begins simultaneously with the contraction of the orbicularis and ceases with its relaxation. It is the closing phase of the movement of the eyelids which leads to compression of the sac and of the upper part of the duct, these parts expanding again when the eyes are opened. It is probable that the upper part of the lacrymonasal duct is entirely closed during forced orbicularis action. *E. M. Blake.*

Ponder, Eric. and Kennedy, W. P. **The act of blinking.** Quarterly J. Exper. Physiol., 1927, v. 18, p. 89-111.

An investigation of the movements of blinking in the normal individual shows that the distribution of the interblink periods (intervals between successive blinks measured in seconds) is remarkably constant under constant experimental conditions. Four types of distribution of the interblink periods

are seen. The authors have attempted to find the causation of these movements and have observed the interblink periods under a whole series of different external conditions. They find that the movements continue practically unchanged under different conditions of humidity, temperature, etc. They are not dependent on the integrity of the second, third, fourth, fifth, or sixth cranial nerves, since they persist, after the abolition of impulses traveling up these nerves. The authors therefore conclude that the movements are not reflex but are centrally controlled, and are dependent on intermittent impulses passing from the region of the basal ganglia. They find that the rate of blinking is closely related to the mental tension of the subject at the time, and that in all probability the movements are a kind of relief mechanism whereby nervous energy otherwise unutilized passes into a highly facilitated path. *F. H. Adler.*

Richter, Helmuth. **On temporary edema of the eyelids in serous meningitis of otitic origin.** Münch. med. Woch., 1927, no. 41, p. 1755.

The author quotes the literature to show that the sudden onset of exophthalmus or edema of the lids in the course of acute or chronic otitis media has long been known to indicate complicating disease of one or both cavernous sinuses. Indeed, by many it is considered as one of the characteristic signs for this disease, the other two being septic temperature and meningeal symptoms. No other intracranial complication of otitis media has been reported so far to give the above eye findings. The author's patient was a girl of four years who three months after a mastoid operation developed a sudden high temperature followed two days later by marked edema of the eyelids. Meningeal findings were lacking. Cavernous sinus thrombosis was thought of, and the sinus opened but no clot found. Spinal puncture revealed a pressure of 410 mm. but a normal cell count. The edema of the lids disappeared the following day and the patient made a quick recovery. This apparently was a case of meningitis serosa as indicated by the temperature, spinal fluid examination, and favorable course of the disease.

The author draws the following conclusions from the case: (1) Serous meningitis may make its first appearance in edema of the eyelids. (2) The diagnostic and therapeutic value of lumbar puncture in these cases.

M. L. Folk.

Sattler, C. H. **Hair as a suture for slit tear ducts.** Zeit. f. Augenh., 1928, v. 64, April, p. 352.

Using human hair sterilized by immersion in alcohol for thirty minutes, the author has successfully sutured the edges of tear ducts that had been slit. *F. H. Haessler.*

Seissiger, F. **Two cases of lid anthrax.** Zeit. f. Augenh., 1926, Nov., v. 60, p. 264.

The author reports two cases of lid anthrax one of which healed completely, the other with slight scarring. The mortality in lid anthrax is twenty-five per cent. Ocular complications are rare: a necrosis of the cornea, corneal perforation, two cases of ophthalmitis, and a bilateral optic atrophy due to mechanical pressure because of increase in volume of the orbital contents are all that have appeared in the literature. The older radical cauterization with actual cautery or caustics has been abandoned. Bier's passive congestion seems to be effective, presumably because the congestion is necessary to cause the leucocytes in the subcutaneous tissue to excrete leucoanthracozidines in sufficient quantity. Specific therapy is helpful only if the serum is repeatedly injected.

F. H. Haessler.

Verderame, F. **Contribution to the surgical treatment of congenital ptosis.** Rev. Gén. d'Opht., 1927, v. 41, July, p. 19.

After a review of the general principles underlying the various operations for ptosis of the upper lids, the author describes in detail a case of almost

complete congenital ptosis operated upon successfully by himself.

His technique is simple. The denuded tissues of the lid are lifted into contact with the frontal muscle, the three sutures being brought out through the skin at a point 3 mm. beyond the upper border of the brow. He controls the final result by anchoring his sutures over cylinders of gauze and altering the traction according to requirements.

J. B. Thomas.

15. TUMORS

Cattaneo, D. **Circumscribed melanosis of the choroid.** Ann. di Ottal., 1926, v. 54, Oct., pp. 1097-1107.

Two cases are described, and the previously reported cases are reviewed. This condition is to be distinguished from melanotic spots on the retina by the facts that the latter are multiple, are partially transparent, and have a finely granular structure, with sharply defined outlines. In circumscribed melanosis of the choroid, the mass of pigment is single, not transparent, but intensely black, with margins fading out into the surrounding tissues. Histologically, the vessels in melanosis possess medial and adventitial coats, while in sarcoma usually only an endothelial lining is present. (Bibliography and three photomicrographs.)

S. R. Gifford.

Pack, George T. **Radiation therapy of cancers of the orbitopalpebral region at the Radium Institute of the University of Paris.** Arch. of Ophth., 1928, v. 57, pp. 246-253.

This very interesting paper describes in brief outline the method followed in the treatment of cancer at the Radium Institute of the University of Paris, with especial reference to those in and about the orbit. Because of the fact that a radium resistance, that lasts indefinitely, develops if the treatment has not been properly controlled, no case is accepted that has been treated elsewhere by x-ray or radium. It has been found that roentgen ray cannot be used after radium has failed, but that radium may be used following unsuccessful x-radiation.

If the eyeball has been removed and ulceration involves most of the orbit, roentgen ray therapy is indicated as most likely to reach all tissues equally. When the eye remains in place, radiation is employed before its removal, as its presence helps to prevent necrosis of the bones of the orbit. Radium therapy is indicated in all other cases, except where complete removal without insurmountable deformity is possible by surgical means.

The roentgen ray dosage should be sufficient to produce an epidermitis, and should be distributed over several days in order to destroy the mother cells. A satisfactory medium for application of the radium is a wax transparent to the gamma rays. Its formula is:

Pure beeswax	100 gms.
Paraffin fusible at 62° Cent.	100 gms.
Sawdust, finely sifted	20 gms.

The statistics of the institute show: totally healed cancers 66.6 per cent; local cures by radiation 74.5 per cent; and of those localized in the eyelids 72.9 per cent. *M. H. Post.*

Schousboë. **Orbital epithelioma.** Ann. d'Ocul., 1928, v. 165, April, pp. 257-260.

A case is described in which the primary growth was from the skin. The orbit was secondarily invaded, even the osseous wall being involved. Complete excision was done, and no recurrence had been noted in more than a year. *L. T. P.*

Schuster, Erna. **A case of psammoma.** Zeit. f. Augenh., 1927, v. 63, Sept., p. 65.

Most optic nerve tumors originate in the nerve itself and are gliomata, and the minority originate in the sheath and are endotheliomata or psammomata. A twenty year old male had with gradual loss of vision, chalky white discs, thin or obliterated arteries, and pigmentation characteristic of old chorioretinitis and retinitis pigmentosa. The diagnosis of psammoma was

determined by the roentgenogram. No other tumor presents so sharp an outline with so granulated a shadow. Histological study confirmed the diagnosis. These tumors do not involve nerves when they arise on the external dural surface, but intradural endotheliomas injure the nerve and also break through the dura. Occasionally they spread intraocularly. Sometimes these tumors arise intracranially, but in the author's case the early loss of vision and field changes which are characteristic were not diagnostically available because the eye had been nearly blind from chorioretinal lesions. There was no enlargement of the optic foramen to suggest an intracranial origin but the author quotes two cases of Dandy's in which these signs also were absent.

F. H. Haessler.

16. INJURIES

Garrido. **Contusion of globe and rupture of sclera.** Arch. de Oft. Hisp.-Amer. 1927, v. 27, March, p. 208.

These lesions are situated generally in the region of Schlemm's canal, probably because the scleral fibers are largely parallel to the limbus at this point. A case is reported due to the blow of a hammer. The conjunctiva showed no lesion, although there was a distinct rupture of the sclera at four o'clock, with a small mass protruding of the size and somewhat the shape of a grain of wheat. The long diameter was parallel with the limbus. There were no changes in the lens, although the vitreous had a finely granular cloud of opacity probably from a small hemorrhage. The vision was reduced approximately one half. Under atropindionin ointment, purgative, rest, hot applications, and a compress bandage, after twenty-six days the eye had returned to normal, with complete visual recovery.

A. G. Wilde.

Gredsted, Alice. **Injury of eyes from spines of cockleburs.** Zeit. f. Augenh., 1928, v. 64, April, p. 357.

The patient had a severe ophthalmia nodosa characterized by tremendous ptosis and swelling of the upper lid, with a granuloma from which burrs protruded, presenting on the conjunctival surface. Excision of the tarsus was necessary to remove all the burrs. Healing took place promptly. Very few cases have appeared in the literature. In all cases only lid and conjunctiva were involved and healing followed removal of the burrs. Experiments on rabbits' eyes with extracts from burrs led to the conclusion that the lesion is not merely a foreign body reaction but rather an opthalmia nodosa due to a volatile oil which is soluble in ether. Early in the disease the foreign body reaction predominates, but when the burr disintegrates and the extractives are liberated much more severe and stormy inflammatory changes become manifest.

F. H. Haessler.

Jess, A. **Eye injuries and their treatment.** Med. Klinik, 1927, v. 48, Dec., p. 1841.

The author gives a survey of the treatment of eye injuries of value to the general practitioner and the specialist, covering the injuries systematically. He emphasizes the need of using antitetanic serum immediately and in large enough doses in all injury cases about the eyes. Injuries to the cornea must be carefully examined as to pneumococcic infection present in the tear sacs, and radical treatment instituted when found. In lime burns, complete cleansing of the conjunctival sac is absolutely necessary. With injuries due to any hairs, the hairs must be removed immediately, or may cause an ophthalmia nodosa. The writer advises that all cases of contusion should be kept in bed for two or three days, even though the fundus shows no hemorrhage or laceration, since a serious detachment may thus be avoided, which otherwise might involve only the macular region. In penetrating injuries it must always be borne in mind that there may be two foreign bodies, though one is only embedded in the cornea. Injuries to the eyes by copper and brass are taken up and the typical picture described.

Beulah Cushman.

Picard, P., and Dreyfus, P. A. **Compression of the thorax followed by immediate and definite blindness.** Arch. d'Opht., 1928, v. 45, June, p. 383.

The literature is reviewed for reports of blindness following crushing injuries of the chest. The writer's own report of one observation was upon a man thirty-seven years old who had his chest crushed in an industrial accident. His sight failed at the moment of injury and he lost consciousness for a few minutes only. There was a characteristic subcutaneous hemorrhage into the face and neck, as well as marked subconjunctival hemorrhage. The pupils were widely dilated, with no reaction to light. Both eyes showed considerable exophthalmos. The media were clear, and the fundi were absolutely normal except for an old patch of choroiditis in the left eye. Tension was normal. The exophthalmos disappeared after six days in the left eye and eight days in the right. There was never any light perception following the accident. Pallor of both discs was noted in about twelve days, and after four weeks the picture of optic atrophy was complete. The orbital hemorrhage was not sufficient to explain the permanent loss of vision. It is possible that a hemorrhage in the substance of the nerve interrupted its nutrition, and as organization took place the compression caused degeneration of the nerve fibers. A complete examination showed no cause for optic atrophy other than the traumatism.

M. F. Weymann.

Yoshimoto, J. **Experimental cauterization of the eye by acids and alkalies.** Arch. f. Augenh., 1928, v. 99, May, p. 188.

Yoshimoto, experimenting with rabbits' eyes, found that cauterization with NaOH of a concentration of N/2 and more, with HCl or H_2SO_4 of N/1 or more, with HNO_3 of 2N or more, or with $C_2H_4O_2$ of 3N produced a phthisis bulbi. Cauterization with NH_4OH of 3N produced a corneal leucoma.

Following cauterization with caustic soda, phthisis bulbi or leucoma can be prevented by copious lavage with slightly acid water or one per cent solution of tannic acid if applied within five minutes.

After cauterization with HCl, H_2SO_4, and HNO_3, phthisis bulbi and leucoma can be prevented by lavage, within five minutes, with a slightly alkaline solution or one per cent tannic acid solution, providing the acid concentration was not above N/1.

Frederick C. Cordes.

17. SYSTEMIC DISEASES, INCLUDING PARASITES

Caloyers, G. **Lymphatism.** Arch. di Ottal., 1927, v. 34, Jan., pp. 23-30.

A general review of the condition of lymphatism and the allied exudative diathesis and neuroarthritism, all of which have many symptoms in common, and are probably based on congenitally faulty metabolism, especially fat metabolism. *S. R. Gifford.*

Cohn, Martin. **The cause of chloroma with ocular lesions.** Arch. of Ophth., 1928, v. 57, p. 238.

This paper opens with a brief description of leukemia and chloroma. The author states that this disease is usually considered a myelogenous leukemia. The fundus lesions do not differ from those of lymphatic leukemia, that is, small or large hemorrhages, preretinal or intraretinal. The smaller ones frequently show glistening whitish dots. The veins are dilated, the arteries normal; both are pale. Edema of the disc and retina, eventually causing papillitis or choked disc, is frequent. The color is orange or yellowish, and the diagnosis of chloroma is made only when the characteristic greenish growths are present. This color is due to the hematogenous pigment, biliviridin, which rapidly fades out on section. Where the objective symptoms are referred to the eye, the features are characteristic. The lids become swollen, proptosis develops, and occasionally swelling may occur in the parotid or other glands. Corneal involvement and panophthalmitis may follow.

The author describes one case in de-

tail. He also gives an interesting description of a serological differentiation of the disease. A number of very interesting plates accompany the article.

M. H. Post.

Dusseldorp. **Keratitis from mumps.** Arch. de Oft. de Buenos Aires, 1928, v. 3, March, p. 270.

Ocular complications of mumps may be regarded as among the rarities of medicine, although the disease is known to involve the lacrymal gland and passages, the uveal tract, the optic nerve, the extrinsic and intrinsic muscles, the conjunctiva, and the cornea.

Corneal complications have been reported ranging from a slight infiltration to complete ulceration. A case is described, in a thirty-two year old man, involving the cornea of the left eye. This was diffusely infiltrated with a deep network of interlacing lines, resembling striate keratitis. By slit-lamp there was a diffuse finely punctate infiltration throughout the corneal substance, increasing in density toward the posterior surface. Descemet's membrane showed many fine gray folds which anastomosed into an irregular network. The iris and lens could not be examined and the fundus reflex was missing. Cases of this type have always been unilateral, and usually have disappeared within two or three weeks without sequelae. A bibliography and a list of reported eye complications are appended.

A. G. Wilde.

Ferguson, A. T. **Blastomycosis of eye and face, secondary to lung infection.** British Med. J., 1928, March 17, p. 442.

No such case of double infection of lung and skin had been reported in the literature available. The patient was a man aged fifty-eight years, ill and emaciated. There was slight sclerokeratitis and ciliary injection of the left eye, and a raised violaceous thickening of the limbal conjunctiva and episcleral tissue, while a large granuloma formed a corona around the cornea. A diagnosis of tubercle was made and this diagnosis confirmed by biopsy from a piece of tumor taken from a lesion on the cheek. With continued growth and spread of the lesions a consultant diagnosed blastomycosis after a positive sputum examination for monilia.

Disappearance of all lesions and a nine pound gain in weight followed increasing doses of potassium iodide up to thirty grains thrice daily and weekly increasing doses of monilia vaccine. Locally the lesions were painted with a solution of 0.5 per cent each of brilliant green and crystal violet.

D. H. O'Rourke.

Gifford, S. R. **Diseases of the eye and adnexa due to fungi and the higher bacteria.** Arch. of Ophth., 1928, v. 57, no. 3, p. 224.

The first part of this interesting paper is taken up with a discussion of the various fungi, especially the leptothrix, antinomyces, sporothrices, phycomycetes. He then discusses the connection of leptothrix with Parinaud's conjunctivitis, and also with one case of conjunctivitis seen by himself.

Streptothrix is discussed in its connection with concretions of the canaliculi.

In speaking of sporothrix the author refers to a case reported by Harold Gifford in 1910 as the first case reported outside of France. Since then a number of cases have been described of various sorts, all characterized by ulceration. The author states that the use of potassium iodide in large doses, one dram three times a day for an adult, nearly always brings about prompt recovery.

Aspergillus fumigatus attacks the cornea violently. Aspergillus flavus has been occasionally reported as producing similar lesions. Occasionally, the latter organism produces lesions that resemble sarcoma in appearance.

Concretions of the canaliculi, sporotrichosis, and keratomycosis are the most frequent and are of very serious import to the patient, and the diagnosis rewards a careful bacteriological study.

M. H. Post.

Horniker, H. **A new viewpoint in the pathogenesis of some degenerative changes in the eye.** Graefe's Arch., 1928, v. 119, p. 488.

Among fifteen hundred patients in the author's practice examined with the slit-lamp and loupe, three hundred and eighty-nine were found to have degenerative changes in the cornea and lens. No eyes were included where the slightest trace of inflammation was present. The corneal changes consisted of opacities in the epithelial and endothelial layers. Degenerative changes in the lens were punctate opacities, including cerulean cataract. In all the three hundred and eighty-nine cases, with few exceptions, more or less severe anomalies of the general vegetative nervous system were regularly present. The degenerative changes in the cornea and lens are therefore an indication of a constitutional vasoneurotic effect.

Detailed tabulation is presented in three hundred and twenty of these individuals ranging in age between eight and eighty years. Ninety-five were males and two hundred and twenty-five were females. These anomalies of the vegetative nervous system are for the most part not acquired but constitutionally inherited. It follows that the degenerative changes in cornea and lens are also probably inherited.

The more frequently appearing changes of the vegetative nervous system in this series were migraine in one hundred and seventy-seven cases, spastic obstipation in one hundred and twenty-one cases, neuroarthritism in one hundred and eleven individuals, and psychic depressive conditions in seventy-one. The blood pressure showed hypertony in two-thirds of the cases.

The author again raises the question whether functional transient but frequently recurring changes in the width of the cappillary lumen and of the capillary network supplyng sensitive or highly organized tissue cannot lead to intermittent functional disturbances, and later, after their longer duration, to permanent anatomical changes by such variation in the nutrition.

H. D. Lamb.

Yoshimoto, J. **Vitamin deficiency in eyes.** Arch. f. Augenh., 1928, v. 99, May, p. 160.

Yoshimoto experimentally produced lenticular changes in rats by means of an avitamin diet. In the examination of the lenses, the refrigeration method was used. The opacification took place primarily in the deeper layers of the lens, the periphery remaining relatively clear. The picture produced was not unlike that of a zonular cataract, and corresponded in type with the so-called avitamin cataract of Szily and Eckstein. *Frederick C. Cordes.*

18. HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Fergus, F. **Field vision and near vision.** British Med. Jour., 1928, Jan. 14, p. 42.

The differences between field vision and macular vision are common knowledge to ophthalmologists. However, some of the practical applications to be deduced from this knowledge are not so generally known. In these days, when oculists are called on so frequently to determine percentage loss of vision and upon this determination to calculate compensation adjustments, sufficient consideration has not been given to field vision. Visual acuteness or macular vision we are accustomed to evaluate by the Snellen formula $V = d/D$, but, as the writer emphasizes, the same has not been held for field vision and probably never will. His proposition that for ordinary manual work field vision is all that is generally used is substantiated by personal experimentation and the careful observation of workmen highly myopic. Correcting lenses in no way influence beneficially the visual properties ascribed to peripheral vision, so that perception and projection, color vision and light sense, are as serviceable and usable to those with lowered central acuity as to those with the accepted normal standard. A consideration of

these facts, and of others which are taken up by the essayist in a most practical manner, necessitates perfect agreement with his statement that "undoubtedly eyesight can be tested for such occupations as reading and writing by Snellen's letters, but you cannot test efficiently for manual work by any such contrivance". *D. H. O'Rourke.*

Jackson, G. A. **Notes on two early American works on the eye.** Arch. of Ophth., 1928, v. 57, pp. 265-268.

The first textbook published in America was John C. Saunders' "Treatise on some practical points relating to diseases of the eye". It was published in 1821 by B. Warner of Philadelphia. The author of this work was an Englishman. The second was by an American, Charles Frick, "Treatise on diseases of the eye", published in Baltimore in 1823.

Jackson also found a copy of John Stevenson's "On morbid sensibility of the eye, commonly called weakness of sight", published by Horatio G. Hale in 1815. The fourth work was that of James Bolton entitled "Treatise on strabismus", published at Richmond, Virginia, in 1842. This book is described by Jackson as a rare classic.

M. H. Post.

James, R. R. **Warner's operation for cataract.** Brit. Jour. Ophth., 1928, v. 12, May, p. 259.

The author quotes from Chandler's "Treatise on diseases of the eye" (A.D. 1780). The patient was seated upon a box with head resting against an assistant, who also fixed the upper lid, the surgeon seated in front fixing the lower lid. The patient was directed to look forward and up. With a Sharp's knife a corneal incision and counter puncture was made, suddenly dividing the inferior part of the cornea. If the incision proved too small it was enlarged with scissors. The lids were closed and the eye allowed to rest a few minutes. The anterior capsule was then wounded, and by gently and firmly pressing the lower portion of the eyeball through the lower lid the lens was delivered. The patient was then placed in a recumbent position for some days. (Five illustrations.)

James, R. R. **William Coward (1658-1725).** Brit. Jour. Ophth., 1928, v. 12, May, p. 241.

Coward's contribution to ophthalmic literature consisted of one small volume, and for the most part he wrote on metaphysical subjects. He is placed in the gallery of British ophthalmologists largely for the fact that one of his better works was ordered burnt by the public hangman. Hirschberg considered "Ophthalmiatria" the work of a charlatan. *D. F. Harbridge.*

Norrie, Gordon. **Causes of blindness in children. Twenty-five years experience of Danish institutes for the blind.** Acta Ophth., 1927, v. 5, no. 4, pp. 357-386.

This analysis of 578 cases of blindness, covering twenty-five years experience by Norrie, is divided into congenital diseases and those acquired after birth. Fifteen per cent of the children were illegitimate, as against the usual figure of ten per cent. There were thirty-two cases of buphthalmos, and the author disagrees with the statement that heredity is largely responsible for this defect. Microphthalmos and coloboma of the choroid were noted thirty-five times. Heredity played only a small or no part. Congenital atrophy of the globe was seen nine times, and the defect is to an exceedingly high degree hereditary. Retinitis pigmentosa was present thirty-two times, and the disease is definitely hereditary. Four instances of consanguinity were encountered in this disease. Cataracts were nearly all of the congenital stratiform variety and were found in forty-one of the children. Hereditary transmission plays a very important part in the etiology. Only sixteen instances of congenital syphilis were met with, causing diffuse parenchymatous keratitis, iridocyclitis, choroiditis, and optic atrophy. Blindness occurring after birth was responsible for 187 of the cases, 49 of which resulted from ophthalmia neonatorum. Recent years have shown a very de-

cided falling off in the number of these cases, as a result of enforced use of silver nitrate among midwives. Scrofulosis was rarely seen, and the writer insists that head lice cause this condition and not an associated tuberculosis. Infectious diseases account for twenty-six cases, pneumonia and measles being the commonest causes. Xerophthalmia was at one time quite frequent, and produced ninety-nine cases of blindness. Iridocyclitis was responsible for thirty-two cases and optic atrophy 138. Among the latter group were twenty-five congenital cases, frequently hereditary, twenty-seven examples of steeple skull and premature ossification of the skull, the latter occurring in twenty-five boys and two girls. Brain tumor resulted in optic atrophy in ten cases, meningitis in thirty-seven. Twenty-six children were blind as the result of injuries.

E. M. Blake.

Pardo, R. **On the relative value of central vision and other component factors of sight in indemnity estimates.** Ann. di Ottal., 1927, v. 55, Nov.-Dec., p. 981.

Professor Pardo urges that not only ophthalmologists must be in accord concerning indemnity percentages for visual losses but these must be approved by the courts. He esimates the total loss of a single eye at thirty-five per cent and evaluates the vision in the remaining eye at sixty-five per cent. If both eyes have suffered the percentages are taken on this ratio and added together. He places central vision as of equal value with other visual functions such as accommodation, light and chromatic sense, depth perception, and muscle movements, and from these calculates a series of values which he considers actual and equitable.

F. Park Lewis.

NEWS ITEMS

News items in this issue were received from Drs. M. Beigelman, Los Angeles; Joseph L. McCool, Portland, Oregon; M. Paul Motto, Cleveland; and G. M. Van Poole, Honolulu. News items should reach **Dr. Melville Black,** Metropolitan building, Denver, by the twelfth of the month.

Deaths

Dr. Chas T. W. Plass, Philadelphia, aged sixty-six years, died July fourth of chronic endocarditis.

Dr. Henry Hager Martin, Savannah, Georgia, aged sixty years, died June twelfth, at the Ogelthorpe Sanatorium, of carcinoma of the stomach.

Dr. Jonathan S. Prout, aged ninety-four years, emeritus professor of ophthalmology at Long Island College Hospital, died June twelfth, at Fishkill, New York.

Dr. Flemming Carrow, Traverse City, Michigan, aged seventy-three years, professor of ophthalmology in the University of Michigan Medical School, 1887 to 1904, died June twenty-third of myocarditis.

Dr. Frederick Wm. Lamb, aged fifty-three years, formerly assistant clinical professor of ophthalmology in the University of Cincinnati College of Medicine, died July twentieth of angina pectoris.

Prof. A. G. Lutkevich (Russia), for many years, the editor of "Vestnik Ophtalmologii", recently died at the age of sixty-one years. He was one of the best representatives of Russian ophthalmology. During his thirty-five years of studying, teaching, and practicing ophthalmology he published over twenty scientific contributions in which he displayed an unusual erudition, a remarkable thoroughness of investigation, and an appealing cautiousness of conclusions. He also edited a textbook, widely used in his country, and which greatly contributed to the education and training of the younger generation of ophthalmologists.

Miscellaneous

According to a recent survey by the Association for the Blind, there are seven hundred blind persons in Saint Louis.

Trachoma in Montana is said to have spread from the Indian reservations to the adjacent white population. On account of a difference of opinion as to diagnosis, Dr. Paul D. Mossman, trachoma expert for the Government, has been invited to study the situation.

A memorial infirmary for the care of students was formally dedicated at the Bucknell University, Lewisburg, Pennsylvania, June fifth. Mrs. Ziegler was the donor, in memory of her late husband, Dr. S. Lewis Ziegler, who was a member of the board of trustees for many years. Judge J. Warren Davis of the United States Circuit Court of Appeals delivered the address of dedication.

According to the Journal of the American Medical Association, August 11, 1928, the offi-

cials of Clearwater County, Minnesota, arrested one Eddie Connor and an alleged accomplice Leon Felix after the pair had accepted nine hundred dollars for performing a fake operation on the eyes of a farmer's wife. "Two other victims, Pat and Timothy O'Brien, farmers of Miesville, told the county attorney that they paid one of the 'specialists', who called himself "Dr." Miles, three hundred dollars for an 'operation' ".

A course on the slit-lamp is being planned for October 8 to 13, 1928, in the University Eye Clinic in the Charité, Berlin. Inquiries should be addressed to the conductor of the course, Privatdozent Dr. A. Meesmann, Universitäts-Augenklinik in der Charité, Berlin NW 6, Schumannstrasse 21.

The third clinical congress on physical therapy will be held in conjunction with the seventh annual meeting of the American College of Physical Therapy, at the Hotel Stevens, Chicago, October 8 to 13, 1928. Sectional meetings in eye, ear, nose, and throat and other medical and surgical branches will be included. Detailed information may be obtained from the American College of Physical Therapy, suite 820-30 North Michigan Avenue, Chicago.

Societies

The sixth annual course in ophthalmology and otolaryngology under the auspices of the Colorado Ophthalmological and Colorado Otolaryngological Societies was held in Denver July 16 to 28. The ophthalmological part of the program (as mentioned in the June issue, page 513) included courses of lectures by Dr. Walter R. Parker of Detroit, Dr. Sanford R. Gifford of Omaha, Dr. Edward Jackson of Denver, Dr. Melville Black of Denver, and Dr. Wm. C. Finnoff of Denver. Demonstration courses were given by various Denver ophthalmologists, as follows: "Testing anomalies of the ocular muscles", by Dr. Wm. M. Bane; "The cross cylinder in refraction", Dr. Wm. H. Crisp; "Surgical anatomy of the eye and orbit", by Dr. Wm. C. Finnoff; "Methods of taking the visual fields", by Dr. John A. McCaw; "Methods of examination", by Dr. Donald H. O'Rourke; "Histopathology of iris diseases", by Dr. James M. Shields. Fifty-three physicians registered for the course, and twenty-three states were represented. Two days in the middle of the course were devoted to the Colorado Summer Congress of Ophthalmology and Otolaryngology, the eye program of which was furnished by Drs. Wm. H. Crisp, Denver; Louis and Ray Daily, Houston; Edward Jackson, Denver; John McReynolds, Dallas; L. W. Oakes, Provo, Utah; and Donald H. O'Rourke, Denver. The registration for this Congress was one hundred and eighteen. An automobile trip over the Denver Mountain Parks system after the first day's meetings of the Congress was followed by a dinner at the Colorado Motor Club house in Bear Creek canyon; this dinner being attended by physicians and members of their families to the number of one hundred and fifty-nine. On the Sunday following the Congress, a luncheon was given at Dr. Finnoff's mountain cottage.

Personals

Professor Lindner of Vienna recently visited the United States.

Dr. Frank A. Plum, Seattle, has joined Dr. J. A. Morgan, Honolulu, in practice limited to the special senses.

Dr. Wm. Zentmayer of Philadelphia has retired from Wills Eye Hospital after many years of valuable service.

Dr. Wm. H. Wilmer, Baltimore, has been elected president of the Johns Hopkins Medical Society.

Dr. Franklin R. Webster has been appointed instructor in ophthalmology at the college of medicine at Syracuse.

Recent visitors to the Hawaiian Islands included Dr. J. Darwin Pines of Philadelphia and Dr. George W. Swift of Seattle.

Dr. Secord H. Large, Cleveland, who for the past year has been visiting the ear, nose, and throat clinics of Europe, returned home August first.

Dr. M. Uribe Troncoso of New York City recently visited Porto Rico, where he was given a hearty welcome by the local ophthalmologists. He gave there two lectures, one on gonioscopy, and the other on ocular manifestations of lues.

Dr. William E. Bruner, professor of ophthalmology in the School of Medicine of Western Reserve, Cleveland, recently received the honorary degree of Doctor of Science from the Wesleyan University of Middletown, Connecticut.

Dr. Edmund B. Spaeth, of Philadelphia, received the first award of the University of Buffalo medal in ophthalmology, at the recent commencement exercises. This medal is made possible by a fund provided by Dr. Lucien Lowe.

Dr. Joseph L. McCool of Portland, Oregon, was a guest of honor of the Utah State Medical Society at its annual meeting held in Ogden in June. He presented two papers before the Eye and Ear Section, the subjects being "Some observations of operative technique", and "Muscular anomalies in relation to errors of refraction".

American Board for Ophthalmic Examinations

(**Note:** The Board will hold its next examination in Saint Louis on Monday, October 15, 1928, that is immediately preceding the meeting of the American Academy of Ophthalmology and Otolaryngology. An examination will be held by the American Board of Otolaryngology on the same date in Saint Louis, and also on October 12 in New York City.)

The American Board for Ophthalmic Examinations held its twenty-seventh examina-

tion at the Wilder Dispensary, Saint Paul, June 11, 1928. Through the valuable assistance of Dr. John F. Fulton and Dr. Frank E. Burch, and the courtesy of Dr. B. E. Smelzel, superintendent of the Miller Hospital, excellent facilities and ample material for conducting the examination were provided.

The following members of the Board were present and conducted the examination of the candidates:

Dr. E. C. Ellett, President
Dr. W. H. Wilder, Secretary-Treasurer
Dr. Allen Greenwood
Dr. Walter R. Parker
Dr. James M. Patton
Dr. William H. Crisp

The examination was in charge of Dr. Allen Greenwood, chairman of the Committee on Examinations.

The examiners were assisted by Drs. William L. Benedict, William W. Lewis, Conrad Berens, John E. Weeks, Paul D. Berrisford, S. Judd Beach, John S. Macnie, Hendrie W. Grant, and Henry E. Binger.

The practical examination embraced the following subjects:

External diseases
Ophthalmoscopy
Pathology and anatomy
Refraction
Ocular muscles
Perimetry
Relation of eye to general disease
Therapeutics and operations

A written examination was held in the afternoon. Thirteen candidates presented themselves for the practical and written examinations.

The Board held its usual executive session in the evening at the Curtis Hotel, Minneapolis, and granted its certificate to the following doctors who had satisfactorily passed the requirements and examinations:

Oliver Miller Babbitt, Portland, Oregon
Mortimer Warren Blair, Philadelphia
Henry Nathan Blum, New Orleans
Edmund Towle Brown, Burlington, Vermont
Malcolm Duncan Campbell, Detroit
Ira Bradford Chadwick, Coffeyville, Kansas
W. Carey Cheek, Springfield, Missouri
George Maurice Constans, Bismarck, North Dakota
John Bliss Corser, Scranton, Pennsylvania
Edwin Blakeslee Dunphy, Boston, Massachusetts
William Davis Gill, San Antonio, Texas
Robert Eugene Golden, Walla Walla, Washington
Harold Leroy Goss, Seattle
Harold Moore Griffith, Johnstown, Pennsylvania
Charles Herndon Haralson, Tulsa, Oklahoma
Walter Louis Hogan, Hartford, Connecticut
Thomas Otis Klingner, Springfield, Missouri
Elmer Ellsworth Langley, Spokane, Washington
Richard Ormond Leavenworth, Saint Paul
Forest Shetterly Letellier, Knoxville, Tennessee.
Turber Lewin, Buffalo
Alfred F. Luhr, Buffalo
John Silliman Macnie, Minneapolis
George Ralph McAuliff, Chicago
Samuel James Meyer, Chicago
Frank Alburtus Millett, Greenfield, Massachusetts
Michael Paul Motto, Cleveland
William Burton Newton, Alpena, Michigan
Bascom H. Palmer, Miami, Florida
Kaspar Pischel, San Francisco
John Edward Pittman, Detroit
Algernon Beverly Reese, New York City
Hugo Bruno Carl Riemer, Boston
Jay Besson Rudolphy, Philadelphia
Ralph Orlando Rychener, Memphis, Tennessee
Raymond John Sisson, Detroit
William LeRoy Smith, Salt Lake City
Shelby Cruthirds Spencer, Waco, Texas
Charles Nelson Spratt, Minneapolis
Isaac Samuel Tassman, Philadelphia
Georgiana Dvorak Theobald, Chicago
Frank Carleton Thomas, Lexington, Kentucky
Hunter Heiner Turner, Pittsburgh
Henry Charles Weber, Great Lakes, Illinois
Henry G. Wincor, New York City
Joseph Deane Woolworth, Shreveport, Louisiana
Walter Milton Yost, Scranton, Pennsylvania

The Board decided to issue a supplementary list of those persons who have been certificated since the publication of its directory. This list will probably be ready before the first of the year and will be sent gratis to all purchasers of the directory.

Dr. Allen Greenwood was elected by the American Ophthalmological Society as its representative on the Board for three years from January 1, 1929, and Dr. E. C. Ellett was elected by the Section on Ophthalmology of the American Medical Association to serve a second term as its representative for three years from January 1, 1929.

WILLIAM H. WILDER
Secretary
122 South Michigan Avenue, Chicago